Metropolitan Council

Program Evaluation and Audit

METRO TRANSIT

Hiawatha Light Rail Transit (HLRT)

Signal & Communications Systems Warranties

January 15, 2007

INTRODUCTION

Background

The Hiawatha Light Rail Transit (HLRT) line began operation in June 2004 from downtown Minneapolis to Fort Snelling (Phase 1A). In December 2004, the HLRT was extended to the Mall of America (Phase 1B). Terms and conditions for the construction of the HLRT were negotiated between MnDOT and Minnesota Transit Constructors (Contractor).

The HLRT project was divided into two types of construction, civil and systems. Civil construction consisted of roadwork, civil structures, stations, trackwork and elevators/escalators. It is not included in this review. Systems construction, the focus of this warranty review, consisted of the overhead cantenary, traction power, communications and signals systems and signage. The Contactor subcontracted Systems work to LK Comstock (LKC). LKC in turn subcontracted much of the Systems work to other firms.

The base warranty for work on each phase of the HLRT is two years upon MnDOT accepting "Completion for Owner's Beneficial Use" or "Revenue-Ready Service Status." In addition, any extended manufacturer warranty period provided to the Contractor was to be passed through to MnDOT and its "successors and assigns," i.e. the Metropolitan Council. HLRT systems warranty periods extended from 25 June 2004 through 24 June 2006 and from 11 November 2004 through 11 November 2006 for Phases 1A and 1B, respectively.

Systems problems are identified via the Supervisory Control and Data Acquisition (SCADA) system. When a signal is received noting a problem, Maintenance personnel respond immediately, fix the problem and then write up the work order (WO). Once written, the WO is tracked in Metro Transit's Txbase work management system and a warranty request is submitted to LKC who determines which of its subcontractors is responsible. LKC then forwards the request to the proper subcontractor. Upon acceptance the subcontractor notifies LKC who subsequently notifies Metro Transit.

Purpose

This audit was conducted to assess Metro Transit's compliance with contract provisions regarding administration of Systems warranty claims, to assess whether Contractor warranties for HLRT Systems parts and components were appropriately utilized and to ensure that Metro Transit could be reimbursed for repairs made to items under warranty. The audit was subsequently expanded to assess the effectiveness of Metro Transit's maintenance WO system and practices to assure that WO costs are captured, adequately identified as warranty work and timely submitted to LKC for reimbursement.

Assurances

This review was conducted in conformance with Government Auditing Standards and the Standards of the Institute of Internal Auditors. Findings are reported to auditee senior management, the Regional Administrator and the Audit Committee of the Metropolitan Council.

Scope

The review of Systems warranties included an assessment of (i) Metro Transit's compliance with contract provisions, (ii) the risk of material loss due to Contractor rejected claims, (iii) the warranty administration process, (iv) the effectiveness of the warranty WO cost capture and identification system, (v) the cost of warranty claims and (v) the adequacy of contract warranty language.

Methodology

To gain an understanding of Metro Transit Systems warranty operations and to assess if the Metropolitan Council (Council) is recouping warranty expenses from the Contractor as appropriate, the following methods of inquiry were used:

- Personnel in Maintenance, Operations and Management were interviewed.
- Warranty claims were sampled.
- Work Order costs were tracked through the Txbase system.
- Warranty management policies and procedures were reviewed.
- Warranty contract language was evaluated.

OBSERVATIONS

Warranty Exposure

Program Evaluation and Audit reviewed a representative random sample of 64 Systems warranty work orders (WOs) from a total of 552 written during the period July 2004 through May 2006. Fifty-four (over 84%) of the sampled WOs were accepted by LKC's subcontractors. In each instance, the subcontractor either provided material or replaced a part taken out of Metro Transit's inventory. The cost to Metro Transit was the diagnostic labor expended exploring the initial problem and the labor incurred to remove, replace and repair faulty material. It is general practice within the industry that diagnostic labor is not included as a cost when submitting warranty claims. Diagnostic labor costs are not separated from other labor costs in Metro Transit's WO cost tracking system. In addition, Metro Transit does not make a practice of including any labor costs in its Systems warranty claims.

Labor, including diagnostic labor, totaling $14,420 for the sample was not invoiced to the Contractor. For all 466 warranty WOs accepted by LKC's subcontractors this would total an estimated $132,000. In addition, six sampled WOs were found to be Metro Transit's responsibility and four were rejected by the Contractor without later being resolved. The resultant 35 total rejected WO's have incurred an estimated $27,000 in material and $10,000 in labor costs. There is also an estimated $55,000 in return-to-vendor parts outstanding at subcontractors for repair and an additional $71,000 in material for which either a claim has been submitted but LKC has not identified a responsible subcontractor or for which a claim has not yet been submitted (see *Return to Vendor Parts*," below). Therefore, the total warranty exposure includes an estimated $142,000 in diagnostic and other labor costs that Metro Transit has not made a practice of including in Systems warranty claims, and an estimated $153,000 in material costs. This represents the exposure at the time of this report and is not reduced by diagnostic labor costs, amounts that may be received in the future from outstanding RTV requests or from future claims to be presented to MnDOT.

Return to Vendor Parts

For 19 (30%) of the 64 items sampled, Metro Transit used its own inventory to replace a defective part and then sent the defective part to the responsible LKC subcontractor for replacement (RTV). Four parts have not been returned, one remained in Metro Transit's inventory and 14 replaced parts were received back by Metro Transit. The average time to send and receive a part was 56 days, almost two months. In two cases the part was replaced the same day, but in two other cases it took over four months for the Contractor to replace the defective part.

Twenty warranty items were outstanding as of September 6, 2006, averaging 181 days (about six months) ranging from 33 days (about one month) to 679 days (about 22 months) with the largest number of items (9) being outstanding between 86 and 121 days (three to four months). The total value of the 20 orders was $60,194, averaging $3,010 and ranging from $24 to $12,757.

Fifteen warranty RTV items were outstanding as of January 4, 2007, averaging 226 days (about seven months) ranging from 15 days (< one month) to 799 days (about 26 months) with five items being outstanding 15 days each, five items being outstanding between 217 and 232 days (about seven months) and three items being outstanding between 477 and 799 days (about 16 to 26 months). The total value of the 15 orders was $55,393, averaging $3,693 and ranging from $24 to $14,040. .

Between September 6, 2006 and January 4, 2007, the number of outstanding RTV orders has been reduced from 20 to 15; however, the average days outstanding have increased from 181 to 226. In addition, the average RTV value increased from $3,010 to $3,692.

Except for the item found to be in Metro Transit's inventory, warranty administration personnel do not have authority or sufficient leverage to prompt Systems subcontractors to respond to RTV requests. As described in the *Background* section above, a warranty request is submitted to LKC who determines which of its subcontractors is responsible. LKC then forwards the request to the proper subcontractor. When the subcontractor accepts the claim it notifies LKC who in turn notifies Metro Transit.

Metro Transit has identified about $71,000 in materials that have either been submitted to LKC for disposition but which have not been claimed by any of its subcontractors or have not been submitted to LKC for initial determination. As previously stated, Metro Transit cannot work directly with the appropriate subcontractor. In addition, LKC has no substantial interest in the outcome of the claim. Therefore, although the extended delay in the RTV orders described herein is not in the interests of Metro Transit, Metro Transit does not have the contract authority to mitigate this problem.

Warranty Administration

A review of the documentation supporting warranty WOs submitted to LKC, disclosed that 35 WOs (55%) were located in both Metro Transit electronic and paper files, 22 (34%) were in the electronic files but not in the paper files, five (8%) were in neither the paper or electronic files but the information was in Txbase, one could not be found in Txbase or any other file and one was a duplicate.

The HLRT contract (Contract) is silent regarding the warranty administration process for the Council as a sub-grantee. MnDOT is the grantee and holds the HLRT contract with the Contractor. Contract warranty administration, as most of the contract, is expressed in terms of the MnDOT-Contractor relationship. As such, there is no contractually set process for the Council to follow when submitting warranty claims. However, Metro Transit's Rail Maintenance Department has a detailed Warranty Management manual for the *Rail Systems Maintenance Warranty Claims System,* dated July 2004 (Manual) that, when followed, provides Metro Transit sufficient assurance that warranty costs are recorded and claims submitted. However, the Manual has not been fully implemented and the system for identifying and submitting warranty claims is inefficient.

When a maintenance WO is opened during the two year warranty period, it automatically is identified as a warranty WO. However, before a claim can be submitted, it must be determined if the WO is for warranty work or involves standard maintenance for which Metro Transit is responsible. This is a time consuming manual process for line managers who make the warranty work determination and then notify the warranty administrator. Sometimes warranty work is not identified until after the warranty period has expired. That is the case for some of the $71,000 identified in *Return to Vendor Parts*, above. Unless initially determined that a claim should be submitted, a defective part may sit in inventory until a demand for it is made

Policies and Procedures

The Manual provides guidance on managing warranty repairs and as stated above, provides assurance, when followed, that warranty costs are recorded and claims submitted. However, it is based upon the same warranty process Metro Transit uses for Bus Operations. Actual warranty practices differ between Rail and Bus operations due to one major criteria; response time. For example, both Manual and Contract warranty clauses assume the presence of on-site manufacturer representatives. That is the case with rail vehicles; however, it is not industry practice to provide on-site Systems personnel. The Manual also incorporates the response time language appearing in the Contract as described under "Contract Clauses," below.

Both the Contract and Manual allow for reimbursement of all costs incurred by Metro Transit for warranty related work; however, it is the practice of Metro Transit to include material and not labor costs in Systems warranty claims. Unlike the vehicle contract that provides for detailed labor rates and bus warranty agreements that provide for standard repair times, no such language is included in the HLRT contract. However, the contract does state that the contractor is responsible for all warranty costs which would include the cost to Metro Transit of removing and replacing defective parts. The cost of all in-house labor, including diagnostic labor, associated with accepted warranty claims is estimated to be about $132,000. When a warranty claim is submitted, hours are shown for the purpose of proving that labor has been incurred to support the claim for replacing a defective part. About 84 percent of all claims were resolved this way. Another 10 percent were found to be Metro Transit's responsibility, leaving 6 percent in dispute to be submitted to MnDOT for resolution with the Contractor. Extrapolating to all 552 warranty WOs, the cost of these disputed warranty WO's is estimated to be about $37,000.

Contract Clauses

Contract warranty language is not geared toward repairing Systems problems; problems that require immediate attention. Although the Contract specifies that all costs incurred by Metro Transit for warranty work are to be borne by the Contractor, it does not specify that Metro Transit has the right to respond immediately without first contacting the Contractor, a process that only delays taking required action.

The Contract's standard seven day response period is also not adequate. A system failure can bring the entire HLRT line to a halt, affect revenue generation and collection, incur the expense of providing bus bridges and strand and upset thousands of customers. Due to the need to repair Systems failures immediately, warranty repairs are made by Metro Transit Maintenance personnel.

CONCLUSIONS

1. *A risk exists that Metro Transit may not be reimbursed for some warranty expense. Systems subcontractors have accepted the great majority of warranty claims submitted. However, Metro Transit does not include diagnostic labor or labor expended removing, replacing and repairing faulty material in its warranty claims. , The total cost of this labor is estimated to be about $132,000 for accepted warranty work completed through June 2006. Metro Transit has also incurred an additional $153,000 in rejected material, outstanding RTV material and unresolved material costs plus $10,000 in rejected claims labor cost associated with Systems warranty work which, as of the date of this report, are in various phases of resolution.*

   Over 84 percent of all warranty claims filed with the Systems subcontractor have been accepted. Although Metro Transit did not request recovery of in-house diagnostic labor or labor costs for disconnecting, handling and reconnecting product under warranty, the total amount that could be invoiced for such effort is estimated to be about $132,000. Although procedures call for the Contractor to be responsible for all such costs, Metro Transit does not invoice Contractors for diagnostic labor stating that doing so would not be in conformance with industry practices and that the contract does not specifically state that other "labor" costs are reimbursable warranty expenses. Aside from labor, there remains an estimated $153,000 in Systems warranty material costs.

2. *The procedures in place to administer HLRT systems warranty, when properly followed, are appropriate for controlling Council exposure. In general, the warranty administration process provides assurance that Contractor and subcontractor warranty costs can be identified; however, WO documentation, warranty WO identification and return-to-vendor administration processes could be improved to assure that all Systems warranty costs are effectively claimed. In regards to RTV administration, the absence of the Council as a party to the HLRT contract negatively affects its ability to administer RTV warranty WOs.*

   The Manual provides for identifying warranty costs, invoicing Council incurred costs to the Contractor, and tracking warranty costs and RTV material within Txbase; however, regarding in-house labor, this has not been consistently followed. In addition, some warranty claim files could not be found, the identification of warranty WOs is labor intensive and untimely, and parts returned to vendor for repair or replacement remain with the vendor for an extended period which increased from 181 to 226 average days outstanding during the four month period September 2006 to January 2007. As the Council looks ahead toward constructing and operating additional light rail lines, such inconsistency could be costly to Metro Transit in the long run.

3. *The HLRT Contract, between MnDOT and the Contractor, contains warranty language befitting civil construction and does not contain adequate provisions for the unique and urgent requirements for Systems warranty repair.*

   The contract's standard seven day response period is not adequate. In addition, the emergency repair provisions are too cumbersome for proper Systems warranty response. A System failure can bring the entire HLRT line to a halt, affect revenue generation and collection, incur the expense of providing bus bridges and strand and upset thousands of customers. Due to the need to repair Systems failures immediately, warranty repairs are handled by in-house maintenance personnel.

RECOMMENDATIONS

Program Evaluation and Audit recommendations are categorized according to the level of risk they pose for the Council. The categories are:

- **Essential** – Steps must be taken to avoid the emergence of critical risks to the Council or to add great value to the Council and its programs. Essential recommendations are tracked through the Audit Database and status is reported twice annually to the Council's Audit Committee.
- **Significant** – Adds value to programs or initiatives of the Council, but is not necessary to avoid major control risks or other critical risk exposures. Significant recommendations are also tracked with status reports to the Council's Audit Committee.
- **Considerations** – Recommendation would be beneficial, but may be subject to being set aside in favor of higher priority activities for the Council, or may require collaboration with another program area or division. Considerations are not tracked or reported. Their implementation is solely at the hands of management.
- **Verbal Recommendation** – An issue was found that bears mentioning, but is not sufficient to constitute a control risk or other repercussions to warrant inclusion in the written report. Verbal recommendations are documented in the file, but are not tracked or reported regularly.

1. (Essential) Metro Transit Rail Maintenance personnel should strengthen their practices regarding monitoring and documenting the status of outstanding RTV parts in order to help facilitate timely receipt of repaired and replaced parts. In particular, the Council should be a signature party to any future LRT contracts in order that day-to-day RTV order administration can be effective.

Between September 6, 2006 and January 4, 2007, the number of outstanding RTV orders has been reduced from 20 to 15; however, the average days outstanding have increased from 181 to 226. In addition, the average RTV value increased from $3,010 to $3,692. Metro Transit RTV administrative personnel also have no authority to induce HLRT Systems subcontractors to attend to RTV order requests and LKC has no incentive to timely monitor such requests.

***Management Response**: Management recognizes this and will make every effort to address this problem in future projects.*

2. (Essential) Metro Transit should revise its present system for identifying and tracking Systems warranty WOs.

Currently, all WOs that are initiated during a warranty period are identified as warranty WOs. This is to assure that a warranty WO does not escape the review of appropriate warranty administration personnel. However, this has resulted in a time consuming and ineffective process of identifying those WOs that are truly warranty WOs and timely submitting the resultant costs to subcontractors for resolution. An estimated $153,000 in Systems warranty material costs has not been resolved.

***Management Response**: Metro Transit currently uses a warranty identifier in TxBase. This warranty identifier is set to tag all system work orders as a warranty claim until it can be researched and identified properly. This permits repairs to be made without downtime to the LRT system. Further review of this practice will be made to determine if there is a more effective*

method to tracking system warranty claims. This is a user defined identifier. Metro Transit will continue review of this process and upgrade as necessary for future projects. Future reports could possibly be created to help quicker processing of warranty claims.

3. **(Significant) Rail Maintenance personnel should take care to maintain warranty records so that all documents required to support a proper warranty claim and Contractor response are retained for an appropriate period of time and can be located.**

   Just over half (55%) of the documentation supporting warranty claims and the Contractor's response were documented in both electronic form and in paper files. About one third (34%) of the claims reviewed were supported by paper files which include the signed documents from both Metro Transit and the Contractor. In addition, one claim could not be found in either system.

   In most cases, federal audit standards require a 7 year retention period for documents after the contract is closed-out. In concert with the Transit records retention schedule, appropriate steps should be taken to ensure that proper review and retention procedures are in place for contractual documents.

   ***Management Response**: Management will contact the Contractor directly for an update to warranty claim recovery. Documents are retained of all warranty claims. They are currently filed in numerical order by work order and are stored in files in the administration area of light rail.*

4. **(Consideration) Metro Transit Rail Maintenance Operations should review the Manual and make revisions as needed to reflect the current HLRT contract, actual practices and the unique requirements of Systems warranty repairs. In addition, future contracts should specifically state the unique warranty requirements of rail Systems in addition to those for civil construction.**

   The existing Manual is based upon practices that work well for Bus Operations; however, they are not appropriate for Rail and specifically for Systems maintenance and warranty work. For example, Contractor representatives are more likely to be on-site to coordinate vehicle warranty work. In addition, the Manual incorporates contract language that is also intended for civil construction rather than rail Systems operations. Specifically, language that calls out a seven day response period and coordination with the Contractor even in emergency situations does not adequately address Systems warranty requirements.

   ***Management Response**: Wording in future contracts will be reinforced regarding entire system defects, pre-determined labor rates for repairs, reliability of the product, etc.*

5. **(Consideration) Metro Transit should be consistent in following written procedures regarding the labor costs for which the Contractor is held responsible.**

   The Contract and Manual both state that the Contractor is responsible for all costs of warranty work. In addition, the Manual provides specific requirements for reporting costs and for what costs are to be included in warranty claims. In actual practice, Rail Operations warranty claims are submitted only for material costs; no in-house labor to identify and perform warranty tasks is included. Metro Transit has incurred an estimated $132,000 in diagnostic and other labor costs for Systems warranty claims already accepted by LKC and its subcontractors.

   ***Management Response**: Metro Transit Management will develop contract language for future contracts that will hold contractors more accountable for warranty claims, follow-up, etc.*