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October 2, 2015

BY RESS & OVERNIGHT COURIER

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, Suite 2700
Toronto, Ontario
M4P 1E4

Dear Ms. Walli:

**Re: Enersource Hydro Mississauga Inc. Application for Distribution Rates
Effective January 1, 2016, Board File No. EB-2015-0065
Supplementary ICM Evidence dated October 2, 2015**

This letter is in response to the Ontario Energy Board's (the "Board's") letter of August 31, 2015 requesting additional evidence to support Enersource's application, dated August 17, 2015, (the "Application") for rate riders related to its previously filed Incremental Capital Module ("ICM").

Enersource provides the following as supplementary evidence to the Application:

1. Supplementary ICM Evidence Summary;
2. 2016 Capital Expenditure Projects Budget Spreadsheet;
3. Enersource Capital Planning Overview 2016-2021; and
4. Business cases for projects included in the ICM.

Two hard copies of this letter and supplementary evidence will be sent to the Board in addition to filing this via RESS.

If you have any questions, please do not hesitate to contact me at (905) 283-4098.

Sincerely,

(Original signed by)

Gia M. DeJulio
Director, Regulatory Affairs

cc. Norm Wolff, Executive Vice-President and Chief Financial Officer, Enersource
Jane Scott, Project Advisor, Ontario Energy Board

Enersource Hydro Mississauga Inc. (“Enersource”) requested an Incremental Capital Module (“ICM”) rate rider related to capital expenditures, less a materiality threshold of \$44.1 million, of \$71.5 million, \$41.6 million of which is for a true-up of two Hydro One Connection and Cost Recovery Agreements (“CCRA”). The Board stated in its letter of August 31, 2015 (the “Letter”) that information related to the two discrete CCRA projects was considered complete. However, the Board considered information related to the remaining request for \$29.9 million incremental capital to be incomplete. This response is directed to the remaining \$29.9 million incremental capital request.

Board Staff Information Request

Board staff identified ten points in its Letter to Enersource. These items are restated and answered below.

1. Amounts must be based on discrete projects, should be directly related to the claimed drivers and must be clearly outside the base upon which the rates were derived.

Response:

Table 5 of the Application Manager’s Summary (excerpted below) provides a summary of the latest approved 2013 Cost of Service capital expenditures, in comparison to 2013 and 2014 actuals, and 2015 and 2016 forecasts. The ICM requested capital amounts of \$71.5 million of which \$41.6 million relates to a true-up for two Hydro One CCRA’s and the remaining \$29.9 million are capital additions in excess of the base upon which rates were derived.

Discrete business cases are provided for all projects included in the requested capital budget. These projects were prioritized based on drivers established by Enersource to meet the Board’s stated outcomes as identified in the Renewed Regulatory Framework for Electricity (namely Customer Focus, Operational Effectiveness, Public Policy Responsiveness, and Financial Performance).

Capital Spend 2012 to 2016

	Actual	COS	Actual	Actual	Forecast	Forecast
	2012	2013	2013	2014	2015	2016
System Service	\$9,860,395	\$12,084,000	\$10,711,823	\$11,227,758	\$16,267,139	\$17,200,000
System Renewal	\$16,224,485	\$16,376,000	\$20,887,175	\$31,256,743	\$35,203,614	\$34,735,000
System Access	\$11,493,425	\$9,458,000	\$10,054,863	\$9,474,167	\$14,632,780	\$12,007,831
General Plant	\$7,005,798	\$11,187,616	\$6,830,748	\$6,230,459	\$10,585,191	\$12,796,000
Total	\$44,584,102	\$49,105,616	\$48,484,610	\$58,189,127	\$76,688,724	\$76,738,831
Administration Building	\$22,214,255	-	-	-	-	-
Hydro One TS Payments	-	-	-	-	-	\$41,656,000
LRT	-	-	-	-	-	\$400,000
Total	\$22,214,255	-	-	-	-	\$42,056,000
TOTAL GROSS	\$66,798,357	\$49,105,616	\$48,484,610	\$58,189,127	\$76,688,724	\$118,794,831
CIAC	(\$1,248,222)	(\$2,933,000)	(\$5,943,622)	(\$4,138,213)	(\$5,654,891)	(\$2,131,250)
TOTAL NET	\$65,550,135	\$46,172,616	\$42,540,987	\$54,050,914	\$71,033,833	\$116,663,581

Table 5 from the Application Manager's Summary

2. An analysis demonstrating that the materiality threshold test has been met and that the amounts will have a significant influence on the operation of the distributor.

Response:

Attachment H of the Application provided the following results based on the Board's materiality threshold formula. The following calculation is an excerpt.

Final Threshold Calculation

$$\text{Threshold Value (\%)} = 1 + \left[\left(\frac{RB}{d} \right) \times (g + PCI \times (1 + g)) \right] + 20\%$$

Year	2016	
Price Cap Index	1.45%	<i>PCI</i>
Growth Factor Calculation		
2014 Actuals	\$120,058,187	
2013 CoS Rebasing Year	\$119,905,810	
Growth Factor	0.13%	<i>g</i>
Dead Band	20%	
Average Net Fixed Assets		
Gross Fixed Assets Opening	\$ 541,300,088	
Add: CWIP Opening	\$ 4,371,726	
Capital Additions	\$ 46,257,875	
Capital Disposals	-\$ 1,026,755	
Capital Retirements	\$ -	
Deduct: CWIP Closing	-\$ 4,371,726	
Gross Fixed Assets - Closing	\$ 586,531,208	
Average Gross Fixed Assets	<u>\$ 563,915,648</u>	
Accumulated Depreciation - Opening	\$ 45,750,490	
Depreciation Expense	\$ 28,721,695	
Disposals	\$ -	
Retirements	-\$ 1,026,755	
Accumulated Depreciation - Closing	\$ 73,445,429	
Average Accumulated Depreciation	<u>\$ 59,597,959</u>	
Average Net Fixed Assets	<u>\$ 504,317,688</u>	
Working Capital Allowance		
Working Capital Allowance Base	\$ 786,215,891	
Working Capital Allowance Rate	14%	
Working Capital Allowance	<u>\$ 106,139,145</u>	
Rate Base	<u>\$ 610,456,834</u>	<i>RB</i>
Depreciation	<u>\$ 28,721,695</u>	<i>d</i>
Threshold Value	<u>154%</u>	
Threshold CAPEX	<u>\$ 44,104,679</u>	<i>Threshold Value × d</i>

- 1
- 2 Therefore, the forecasted 2016 capital expenditures of \$116.7 million surpass the threshold
- 3 value.

1 Enersource has identified the need for significant capital investment in its system, initially in its
2 Cost of Service application, EB-2012-0033, and again in this Application. Enersource has
3 demonstrated its commitment to renew its system with increased capital spend in 2014 of
4 almost \$10 million over actual capital expenditures in 2013 of \$48.5 million, and a currently
5 forecasted capital expenditure of \$76.7 million in 2015, a \$28.2 million increase over 2013. The
6 continued renewal of Enersource's distribution system, as indicated by its forecasted 2016
7 gross capital expenditures of \$76.7 million, is significant and necessary for maintaining and
8 continuing the safe and reliable operation of its system.

- 9 3. Justification that the amounts to be incurred will be prudent. This means that the
10 distributor's decision to incur the amounts represents the most cost-effective option (but
11 not necessarily the least initial cost) for ratepayers.

12 Response

13 Please find attached the Enersource Capital Planning Overview 2016-2021 which provides a
14 description of the process Enersource uses to assess and prioritize capital spending options.
15 This overall process ensures Enersource exhibits prudent decision-making in its capital
16 planning.

17 Also, the attached business cases identify alternatives, including maintaining the status-quo,
18 and the potential impact of these alternatives.

- 19 4. Justification that amounts being sought are directly related to the cause which must be
20 clearly outside of the base upon which current rates were derived.

21 Response:

22 Please see response to #1.

- 23 5. Evidence that the incremental revenue requested will not be recovered through other
24 means (e.g., it is not, in full or in part, included in base rates or being funded by the
25 expansion of service to include new customers and other load growth).

1 Response:

2 Enersource has reduced total capital expenditures by \$2.1 million to account for customer
3 contributions for road projects, new developments, and new services. In addition, capital
4 expenditures related to the large commercial interval meters project of \$1.5 million which will be
5 recorded in account 1557, has been excluded from total capital expenditures.

6 For more detailed project information refer below to Table 1 - Contributions in Aid of
7 Construction.

8 6. Details by project for the proposed capital spending plan for the expected in-service
9 year.

10 Response:

11 See the 2016 Capital Expenditure Projects Budgets Spreadsheet, and business cases provided,
12 for the expected in-service year.

13 7. A description of the proposed capital projects and expected in-service dates.

14 Response:

15 See business cases provided for description of the projects and expected in-service dates.

16 8. Calculation of the revenue requirement (i.e., the cost of capital, depreciation, and PILs)
17 associated with each proposed incremental capital project.

18 Response:

19 Enersource calculates revenue requirement for net fixed assets based on pooled assets which
20 consist of a combination of multiple projects. Furthermore, each individual project expenditure is
21 allocated to various individual components of Plant, Property, and Equipment and depreciated
22 based on the useful life of that component. To calculate revenue requirement on each individual
23 project would be complicated, very time-consuming, and not reflective of Enersource's
24 accounting methods.

9. Calculation of revenue requirement offsets associated with each incremental project due to revenue to be generated through other means (e.g., customer contributions in aid of construction).

Response:

Enersource's 2016 forecasted contributions in aid of construction of \$2.1 million, which have been excluded from the revenue requirement, are itemized at a business unit level as follows:

Contributions in Aid of Construction	Amount
Roads	\$600,000
New Subdivisions	\$500,000
Industrial/Commercial Services	\$1,000,000
Residential Service Upgrades	\$31,250
TOTAL	\$2,131,250

Table 1 - Contributions in Aid of Construction

10. A description of the actions the distributor would take in the event that the OEB does not approve the application.

Response:

Enersource's 2016 capital budget reflects the forecasted amount of non-discretionary infrastructure renewal Enersource must undertake. This budget has been approved in principle by Enersource's Board of Directors and Enersource will proceed, in any event, with the projects identified in order to maintain current overall levels of system safety and reliability, and continue to meet customer requirements and expectations. Enersource is requesting Board approval to include recovery of these forecasted capital costs via a rate rider, for eventual true-up against prudent actual expenditures. If these costs are not recovered in rates, Enersource will have to reconsider its future approach to maintaining its high reliability levels.

1 Distribution System Plan (“DSP”)

2 Enersource has prepared a draft DSP which it intends to make available to customers in its
3 formal customer engagement activities scheduled to be completed later this fall. Enersource has
4 not yet filed with the Board the DSP as it does not yet reflect customer preferences but a draft
5 copy could be provided, at the request of Board staff, with the caveat that it will be updated as
6 customer input is received.

**ENERSOURCE HYDRO MISSISSAUGA
CAPITAL EXPENDITURE PROJECTS
2016 BUDGET**

Business Unit	Description	Budget	Business Case #	In Service Date
<i>C0504 - Substation Upgrade</i>	Mini Orlando MS	\$ 2,850,000	2016-C0504-1	2016
<i>C0504 - Substation Upgrade</i>	Orr MS	\$ 1,500,000	2016-C0504-2	2016
<i>C0504 - Substation Upgrade</i>	Rifle Range MS	\$ 2,350,000	2016-C0504-3	2016
<i>C0504 - Substation Upgrade</i>	Cawthra MS	\$ 800,000	2016-C0504-4	2016
<i>C0504 - Substation Upgrade</i>	Webb MS	\$ 2,800,000	2016-C0504-5	2017
<i>C0504 - Substation Upgrade</i>	Mini Britannia - Land	\$ 500,000	2016-C0504-6	2016
<i>C0504 - Substation Upgrade</i>	Duke MS - Land	\$ 500,000	2016-C0504-7	2016
<i>C0504 - Substation Upgrade</i>	Site Enhancements	\$ 300,000	2016-C0504-8	2016
<i>C0504 - Substation Upgrade</i>		\$ 11,600,000		
1 <i>C0507 - Subtransmission Expansion</i>	Churchill Meadows Feeder Egress (Easement) - TS to Winston Churchill	\$ 450,000	2016-C0507-1A	Q4 2016
2 <i>C0507 - Subtransmission Expansion</i>	Port - Stavebank to Elizabeth	\$ 300,000	2016-C0507-1B	Q4 2016
3 <i>C0507 - Subtransmission Expansion</i>	Cawthra - Burnhamthorpe to Bloor	\$ 900,000	2016-C0507-1C	Q4 2016
4 <i>C0507 - Subtransmission Expansion</i>	Webb MS Feeder Egress - Section 1	\$ 750,000	2016-C0507-1D	Q4 2016
<i>C0507 - Subtransmission Expansion</i>		\$ 2,400,000		
1 <i>C0576 - Auto Switches/SCADA</i>	U/G installation of SCADA/Automation switches	\$ 700,000	2016-C0576-1	2016
2 <i>C0576 - Auto Switches/SCADA</i>	O/H installation of SCADA/Automation switches	\$ 780,000	2016-C0576-2	2016
3 <i>C0576 - Auto Switches/SCADA</i>	Station RTU & Protection Relay and Battery & Charger Replacements	\$ 945,000	2016-C0576-3	2016
5 <i>C0576 - Auto Switches/SCADA</i>	RTU System Enhancements	\$ 405,000	2016-C0576-4	2016
6 <i>C0576 - Auto Switches/SCADA</i>	SCADA Master Upgrade	\$ 150,000	2016-C0576-5	2016
7 <i>C0576 - Auto Switches/SCADA</i>	WiMAX Wireless Network Project	\$ 220,000	2016-C0576-6	2016
<i>C0576 - Auto Switches/SCADA</i>		\$ 3,200,000		
SYSTEM SERVICE		\$ 17,200,000		
1 <i>C0505 - Subdivision Rebuild</i>	Ellengale - Ibbetson Cres/ Shamir	\$ 2,000,000	2016-C0505-1A	2016
2 <i>C0505 - Subdivision Rebuild</i>	Rockwood - Fieldgate/ Maple Ridge	\$ 1,500,000	2016-C0505-1B	2016
3 <i>C0505 - Subdivision Rebuild</i>	Clarkson - Bromsgrove/ Cramer/Sherhill	\$ 1,750,000	2016-C0505-1C	2016
4 <i>C0505 - Subdivision Rebuild</i>	Campobella/ Argentia	\$ 1,000,000	2016-C0505-1D	2016
5 <i>C0505 - Subdivision Rebuild</i>	Baldwin/ Melton	\$ 1,500,000	2016-C0505-1E	2016
6 <i>C0505 - Subdivision Rebuild</i>	Malton - Wrenwood/ Rockhill/ Bayswater	\$ 1,500,000	2016-C0505-1F	2016
7 <i>C0505 - Subdivision Rebuild</i>	Woodlands/ Wiltshire	\$ 1,500,000	2016-C0505-1G	2016
8 <i>C0505 - Subdivision Rebuild</i>	Autumn Harvest Section 3 - Wagondust	\$ 1,500,000	2016-C0505-1H	2016
9 <i>C0505 - Subdivision Rebuild</i>	Mississauga Valley Blvd feeder - North side	\$ 1,000,000	2016-C0505-1I	2016
<i>C0505 - Subdivision Rebuild</i>		\$ 13,250,000		
1 <i>C0561 - Overhead Rebuilds</i>	2016 Overhead Switch Replacement Program	\$ 300,000	2016-C0561-1A	2016
2 <i>C0561 - Overhead Rebuilds</i>	2016 Insulator Replacement Program	\$ 300,000	2016-C0561-1B	2016
3 <i>C0561 - Overhead Rebuilds</i>	2016 Stores Small Capital Material	\$ 400,000	2016-C0561-1C	2016
4 <i>C0561 - Overhead Rebuilds</i>	2016 Wood Pole Installations	\$ 400,000	2016-C0561-1D	2016
5 <i>C0561 - Overhead Rebuilds</i>	2016 Concrete Pole Installations	\$ 800,000	2016-C0561-1E	2016
6 <i>C0561 - Overhead Rebuilds</i>	2016 Misc Capital (FIs, Term Poles, Animal Protection, Grounding Replacements)	\$ 200,000	2016-C0561-1F	2016
7 <i>C0561 - Overhead Rebuilds</i>	Vermouth/Breckonridge	\$ 360,000	2016-C0561-1G	2016
8 <i>C0561 - Overhead Rebuilds</i>	Holburne - Section 1	\$ 360,000	2016-C0561-1H	2016
9 <i>C0561 - Overhead Rebuilds</i>	Meadow Wood/Country Club	\$ 1,170,000	2016-C0561-1I	2016

ENERSOURCE HYDRO MISSISSAUGA CAPITAL EXPENDITURE PROJECTS 2016 BUDGET

	Business Unit	Description	Budget	Business Case #	In Service Date
10	<i>C0561 - Overhead Rebuilds</i>	Hull/Studley	\$ 720,000	2016-C0561-1J	2016
11	<i>C0561 - Overhead Rebuilds</i>	Wharton Way/Berkel	\$ 360,000	2016-C0561-1K	2016
12	<i>C0561 - Overhead Rebuilds</i>	Credit Woodlands - Section 2	\$ 720,000	2016-C0561-1L	2016
	<i>C0561 - Overhead Rebuilds</i>		\$ 6,090,000		
1	<i>C0562 - Subtransmission Renewal</i>	Bloor - Cawthra to Tomken	\$ 600,000	2016-C0562-1A	2016
2	<i>C0562 - Subtransmission Renewal</i>	Lakeshore - Seneca to Cawthra	\$ 690,000	2016-C0562-1B	2016
3	<i>C0562 - Subtransmission Renewal</i>	Park - Hurontario to Kane	\$ 960,000	2016-C0562-1C	2016
4	<i>C0562 - Subtransmission Renewal</i>	Queen - Briarwood to Seneca	\$ 600,000	2016-C0562-1D	2016
5	<i>C0562 - Subtransmission Renewal</i>	Goreway - Derry to City Limits	\$ 1,200,000	2016-C0562-1E	2016
6	<i>C0562 - Subtransmission Renewal</i>	Stavebank MS - Feeder Egress	\$ 150,000	2016-C0562-1F	2016
	<i>C0562 - Subtransmission Renewal</i>		\$ 4,200,000		
1	<i>C0563 - U/G TX/Replace/Overhaul</i>	Underground Transformer and Equipment Renewal	\$ 4,125,000	2016-C0563-1	2016
	<i>C0563 - U/G TX/Replace/Overhaul</i>		\$ 4,125,000		
1	<i>C0564 - O/H TX/Replace/Overhaul</i>	Overhead Transformer and Equipment Renewal	\$ 3,000,000	2016-C0564-1	2016
	<i>C0564 - O/H TX/Replace/Overhaul</i>		\$ 3,000,000		
1	<i>C0565 - U/G Cable Replace</i>	Pad Mounted Switchgear Replacement	\$ 1,780,000	2016-C0565-1	Q4 2016
2	<i>C0565 - U/G Cable Replace</i>	Primary Distribution Equipment Replacement	\$ 475,000	2016-C0565-2	Q4 2016
3	<i>C0565 - U/G Cable Replace</i>	Underground Cable and Splice Replacement	\$ 1,400,000	2016-C0565-3	Q4 2016
4	<i>C0565 - U/G Cable Replace</i>	Secondary Cable Replacements	\$ 95,000	2016-C0565-4	Q4 2016
	<i>C0565 - U/G Cable Replace</i>		\$ 3,750,000		
1	<i>C0567 - Emergency Replacements</i>	Emergency Replacements	\$ 320,000	2016-C0567-1	2016
	<i>C0567 - Emergency Replacements</i>		\$ 320,000		
	<i>SYSTEM RENEWAL</i>		\$ 34,735,000		
1	<i>C0531 - Roads</i>	QEW - Hurontario to Mississauga Road	\$ 1,500,000	2016-C0531-1A	2016
2	<i>C0531 - Roads</i>	MCLAUGHLIN ROAD WIDENING - EGLINTON TO PARKWOOD	\$ 600,000	2016-C0531-1B	2016
3	<i>C0531 - Roads</i>	GOREWAY at CITY LIMITS (GRADE SEPARATION)	\$ 300,000	2016-C0531-1C	2016
4	<i>C0531 - Roads</i>	TORBRAM ROAD - Grade Separation	\$ 300,000	2016-C0531-1D	2016
5	<i>C0531 - Roads</i>	Various Intersections	\$ 300,000	2016-C0531-1E	2016
6	<i>C0531C - CIAC - Roads</i>	Customer Contributions	\$ (600,000)		
	<i>C0531 - Roads</i>		\$ 2,400,000		
1	<i>C0532 - LRT</i>	Design - Underground	\$ 200,000	2016-C0532-1	2022
2	<i>C0532 - LRT</i>	Design - Overhead	\$ 200,000	2016-C0532-1	2022
	<i>C0532 - LRT</i>		\$ 400,000		
1	<i>C0541 - New Subdivisions(OfferConnect</i>	New Subdivisions	\$ 800,000	2016-C0541/C0542/C0544-1	Q4 2016
2	<i>C0541C - CIAC - New Subdivisions (OTI</i>	Customer Contributions	\$ (500,000)		
	<i>C0541 - New Subdivisions(OfferConnect)</i>		\$ 300,000		
1	<i>C0542 - Ind/Comm Services</i>	Industrial/Commercial Services	\$ 2,600,000	2016-C0541/C0542/C0544-1	Q4 2016
2	<i>C0542C - CIAC Ind/Comm Services</i>	Customer Contributions	\$ (1,000,000)		
	<i>C0542 - Ind/Comm Services</i>		\$ 1,600,000		
1	<i>C0544 - Residential Service Upgrades</i>	Residential Service Upgrades	\$ 125,000	2016-C0541/C0542/C0544-1	Q4 2016

**ENERSOURCE HYDRO MISSISSAUGA
CAPITAL EXPENDITURE PROJECTS
2016 BUDGET**

Business Unit		Description	Budget	Business Case #	In Service Date
2	C0544C - CIAC Residential Service Upg	Customer Contributions	\$ (31,250)		
	C0544 - Residential Service Upgrades		\$ 93,750		
1	C0594 - Smart Meters Large Users	900 Large Commercial Interval Meter Replacement Project	\$ 936,947	2016-C0594-1	December-01-16
2	C0594 - Smart Meters Large Users	Collector (Gatekeeper) Replacement/Removal	\$ 568,564	2016-C0594-2	December 2016
	C0594 - Smart Meters Large Users		\$ 1,505,511		
1	C0597 - Grid Supply Point Metering	TCP/IP GSP Conversion & Reseal	\$ 163,320	2016-C0597-1	2016
2	C0597 - Grid Supply Point Metering	Tomken Upgrade	\$ 1,100,000	2016-C0597-2	2016
	C0597 - Grid Supply Point Metering		\$ 1,263,320		
2	C0598 - Metering	Maint and Replace Small Comm Non-Demand	\$ 212,000	2016-C0598-1	Q4 2016
3	C0598 - Metering	New Installations Small Comm Non-Demand	\$ 200,000	2016-C0598-2	2016
4	C0598 - Metering	New Installations Large Comm/Ind with Demand	\$ 175,000	2016-C0598-2	2016
5	C0598 - Metering	New Residential Installs - Customer Engineering	\$ 170,000	2016-C0598-2	2016
6	C0598 - Metering	Residential Maintenance	\$ 165,000	2016-C0598-1	Q4 2016
7	C0598 - Metering	PMU - Maintenance/Failure	\$ 150,000	2016-C0598-3	2016
8	C0598 - Metering	PMU - New Installs	\$ 100,000	2016-C0598-4	2016
	C0598 - Metering		\$ 1,172,000		
1	C0899 - Smart Meters - New Condos	New IMS	\$ 1,023,000	2016-C0899-1	Q2 2016
2	C0899 - Smart Meters - New Condos	Retrofit IMS	\$ 364,000	2016-C0899-1	Q2 2016
	C0899 - Smart Meters - New Condos		\$ 1,387,000		
1	C0900 - Green Energy - FIT/MicroFIT	FIT & MicroFIT Projects	\$ 155,000	2016-C0900-1	2016
	C0900 - Green Energy - FIT/MicroFIT		\$ 155,000		
	SYSTEM ACCESS		\$ 10,276,581		
1	C0581 - Engineering & Asset Systems	Hardware Refresh	\$ 280,000	2016-C0585-1	2016
2	C0581 - Engineering & Asset Systems	InService Upgrade	\$ 125,000	2016-C0581-1	Q4 2016
3	C0581 - Engineering & Asset Systems	G/Technology Upgrade	\$ 70,000	2016-C0581-2	Q4 2016
4	C0581 - Engineering & Asset Systems	SmartPlant Foundation Upgrade	\$ 320,000	2016-C0581-3	June, 2016
5	C0581 - Engineering & Asset Systems	Miscellaneous Engineering Software	\$ 30,000	2016-C0581-4	2016
6	C0581 - Engineering & Asset Systems	IOM Automated Switch Planning	\$ 60,000	2016-C0581-5A	2016
7	C0581 - Engineering & Asset Systems	AM/FM/GIS Subtransmission Conversion	\$ 70,000	2016-C0581-6A	2016
8	C0581 - Engineering & Asset Systems	IOM Mobile Deployment - Phase 2	\$ 75,000	2016-C0581-5B	2016
9	C0581 - Engineering & Asset Systems	Transformer Load Analysis Integration to AM/FM	\$ 20,000	2016-C0581-6B	2016
10	C0581 - Engineering & Asset Systems	Major Equipment Location Tracking	\$ 95,000	2016-C0581-6C	2016
11	C0581 - Engineering & Asset Systems	Asset Inspection Enhancements	\$ 65,000	2016-C0581-6D	2016
12	C0581 - Engineering & Asset Systems	IOM Defects	\$ 300,000	2016-C0581-5D	2016
	C0581 - Engineering & Asset Systems		\$ 1,510,000		
1	C0584 - Rolling Stock	Bucket Trucks	\$ 1,190,000	2016-C0584-1	2016
2	C0584 - Rolling Stock	Dump Trucks	\$ 535,000	2016-C0584-1	2016
3	C0584 - Rolling Stock	Pickup Trucks	\$ 645,000	2016-C0584-1	2016
4	C0584 - Rolling Stock	Trailers	\$ 120,000	2016-C0584-1	2016
5	C0584 - Rolling Stock	Vans	\$ 285,000	2016-C0584-1	2016
	C0584 - Rolling Stock		\$ 2,775,000		
1	C0585 - Computer Equip	Email Messaging System Upgrade	\$ 65,000	2016-C0585-1	2016

ENERSOURCE HYDRO MISSISSAUGA **CAPITAL EXPENDITURE PROJECTS** **2016 BUDGET**

Business Unit	Description	Budget	Business Case #	In Service Date
2 C0585 - Computer Equip	Mobile Phone platform renewal/upgrade	\$ 52,000	2016-C0585-1	2016
3 C0585 - Computer Equip	Printer Platform upgrade	\$ 44,000	2016-C0585-1	2016
4 C0585 - Computer Equip	All-In-Ones Toshiba Printers/Copiers/scanners upgrade	\$ 145,000	2016-C0585-1	2016
5 C0585 - Computer Equip	BladeCentre Chassis Mavis Datacentre upgrade	\$ 45,000	2016-C0585-1	2016
6 C0585 - Computer Equip	Microsoft Licensing True up	\$ 50,000	2016-C0585-1	2016
7 C0585 - Computer Equip	Virtual Hold for Customer Service	\$ 140,000	2016-C0585-1	2016
8 C0585 - Computer Equip	IT Assets Inventory tool	\$ 80,000	2016-C0585-1	2016
9 C0585 - Computer Equip	Additional hardware	\$ 50,000	2016-C0585-1	2016
C0585 - Computer Equip		\$ 671,000		
1 C0588 - ERP System	JDE Major Version Upgrade	\$ 600,000	2016-C0588-1	2017
2 C0588 - ERP System	Flex Time Tracking Upgrade/Migration	\$ 100,000	2016-C0588-1	2016
3 C0588 - ERP System	Additional software licenses/enhancements and hardware	\$ 75,000	2016-C0588-1	2016
4 C0588 - ERP System	Microsoft Business Intelligence Phase 2	\$ 200,000	2016-C0588-2	Q2 2016
5 C0588 - ERP System	Long Term Asset Planning Solution	\$ 750,000	2016-C0588-3	2017
6 C0588 - ERP System	IBM Cognos - JDE Intergration - Operating vs Capital Tracking by Employee	\$ 80,000	2016-C0588-1	2016
7 C0588 - ERP System	Customer Service Live Chat	\$ 30,000	2016-C0588-1	2016
8 C0588 - ERP System	AP - Link - EFT	\$ 50,000	2016-C0588-1	2016
9 C0588 - ERP System	Asset Maintenance Management - Substations	\$ 300,000	2016-C0581-6H	2016
C0588 - ERP System		\$ 2,185,000		
1 C0589 - Meter to Cash	Oracle Web Self Service Module Phase 1	\$ 400,000	2016-C0589-1	2016
2 C0589 - Meter to Cash	Monthly billing	\$ 725,000	2016-C0589-2	Q4 2016
3 C0589 - Meter to Cash	Deposit review process	\$ 50,000	2016-C0589-5A	Q4 2016
4 C0589 - Meter to Cash	IMS collections	\$ 40,000	2016-C0589-5B	Q4 2016
5 C0589 - Meter to Cash	Cash Processing and scanning equipment	\$ 75,000	2016-C0589-5C	Q4 2016
6 C0589 - Meter to Cash	Automate notice: Residential customers	\$ 30,000	2016-C0589-5D	Q4 2016
7 C0589 - Meter to Cash	PrimeRead TOU billing replacement	\$ 200,000	2016-C0589-3	2016
8 C0589 - Meter to Cash	CC&B Upgrade	\$ 950,000	2016-C0589-4	October-31-16
C0589 - Meter to Cash		\$ 2,470,000		
1 C0591 - Grounds & Building	Mavis Asphalt	\$ 225,000	2016-C0591-1	Q3 2016
2 C0591 - Grounds & Building	Infrastructure and Security upgrades (Electrical, fire and life safety)	\$ 200,000	2016-C0591-2	Q3 2016
3 C0591 - Grounds & Building	Energy conservation, waste reduction and Health & Safety programs	\$ 150,000	2016-C0591-3	Q3 2016
4 C0591 - Grounds & Building	Mavis HVAC & Mechanical Upgrades	\$ 100,000	2016-C0591-4	Q4 2016
5 C0591 - Grounds & Building	Building Automation System	\$ 200,000	2016-C0591-5	Q4 2016
6 C0591 - Grounds & Building	Mavis Building Envelope	\$ 500,000	2016-C0591-6	Q4 2016
7 C0591 - Grounds & Building	Derry HVAC Upgrades	\$ 500,000	2016-C0591-7	Q4 2016
8 C0591 - Grounds & Building	Mavis Building Reno to Middle Tower Main Floor	\$ 225,000	2016-C0591-8	Q4 2016
9 C0591 - Grounds & Building	Mavis Warehouse Wall, Walkway and Trades Training Centre	\$ 300,000	2016-C0591-9	Q4 2016
10 C0591 - Grounds & Building	Mavis Warehouse Offices and Washroom	\$ 300,000	2016-C0591-10	Q4 2016
11 C0591 - Grounds & Building	Computer Room Halon Conversion	\$ 285,000	2016-C0591-11	Q2 2016
C0591 - Grounds & Building		\$ 2,985,000		
1 C0595 - Major Tools Constr	Major Tools	\$ 200,000	2016-C0595-1	2016
C0595 - Major Tools Constr		\$ 200,000		

**ENERSOURCE HYDRO MISSISSAUGA
CAPITAL EXPENDITURE PROJECTS
2016 BUDGET**

Business Unit	Description	Budget
GENERAL PLANT		\$ 12,796,000
NET CAPITAL EXPENDITURES (EXCLUDING HYDRO ONE TS PAYMENTS)		\$ 75,007,581
<i>Hydro One TS Payments</i>		\$ 41,656,000
NET CAPITAL EXPENDITURES BEFORE ADJUSTMENTS		\$ 116,663,581
<i>Add: AFUDC - Allowance for Funds Used During Construction</i>		\$ 483,000
<i>Less: Recovery through Variance Account 1557 - Smart Meters Large Users</i>		\$ (1,505,511)
NET CAPITAL EXPENDITURES		\$ 115,641,070
<i>Less: Capex Materiality Threshold</i>		\$ (44,104,679)
INCREMENTAL CAPITAL MODULE REQUEST AMOUNT		\$ 71,536,391

Business Case #

In Service Date



Enersource Hydro Mississauga Inc.

Capital Planning Overview

2016-2021

Asset Management System Overview and Planning Overview

The objective of the Distribution System Plan (“DSP”) is to make recommendations for additions, replacement, disposal, and maintenance of the assets in the most efficient manner that realizes value and achieves the performance outcomes established by Enersource. The goal of the yearly DSP is to then outline how Enersource effectively manages its assets on a life-cycle basis, with investment plans that are prioritized and aligned with the Comprehensive Asset Management Policy (“CAMP”) and the Strategic Plan.

Asset Management Framework – Goals and Objectives

The DSP has been developed around the Strategic Plan with regards to the following key factors: planning, prioritization, and execution of programs and projects. The investments have been identified and classified into the following investment categories:

System Access - modifications (including asset relocation) to Enersource’s distribution system that Enersource is obligated to perform to provide a customer (including a generator customer) or group of customers with access to electricity services via the distribution system.

System Renewal - involve replacing and/or refurbishing system assets to extend the original service life of the assets and thereby maintain the ability of Enersource’s distribution system to provide customers with electricity services.

System Service - modifications to Enersource’s distribution system to ensure the distribution system continues to meet Enersource’s objectives while addressing anticipated future customer electricity service requirements.

General Plant - modifications, replacements or additions to Enersource’s assets that are not part of its distribution system, including land and buildings; tools and equipment; rolling stock and electronics devices and software used to support day to day business and operations activities.

Asset management is an Enersource-wide discipline guided by the following principles for the development and implementation of asset related programs or projects:

- **Risk based:** Incorporate risk management appropriately into decision making strategy;
- **Sustainable:** Optimize asset life cycle value;
- **Multi-disciplinary:** Asset management accountability framework crosses departmental and discipline boundaries;
- **Integration Oriented:** View assets in their total relative value context;
- **Optimal:** Strike the right balance among competing objectives, such as short-term performance and reliability versus long-term planning and sustainability; and
- **Systematic:** Rigorously applied in a structured management system complete with a monitoring framework and evidentiary structures and tools.

Enersource formalized these guiding principles into its CAMP in 2013. With the creation of the policy, Management also began to reinforce that good asset management practices need to be an integrated business discipline involving planning, finance, engineering, maintenance, and operations.

In order to strike the optimal balance among risks, performance, and costs in a sustainable fashion that maximizes value while complying with all health, safety, environmental, and regulatory requirements, Enersource established an asset management framework that will allow it to continuously improve its current asset management system and planning processes, as shown in **Figure 1**.

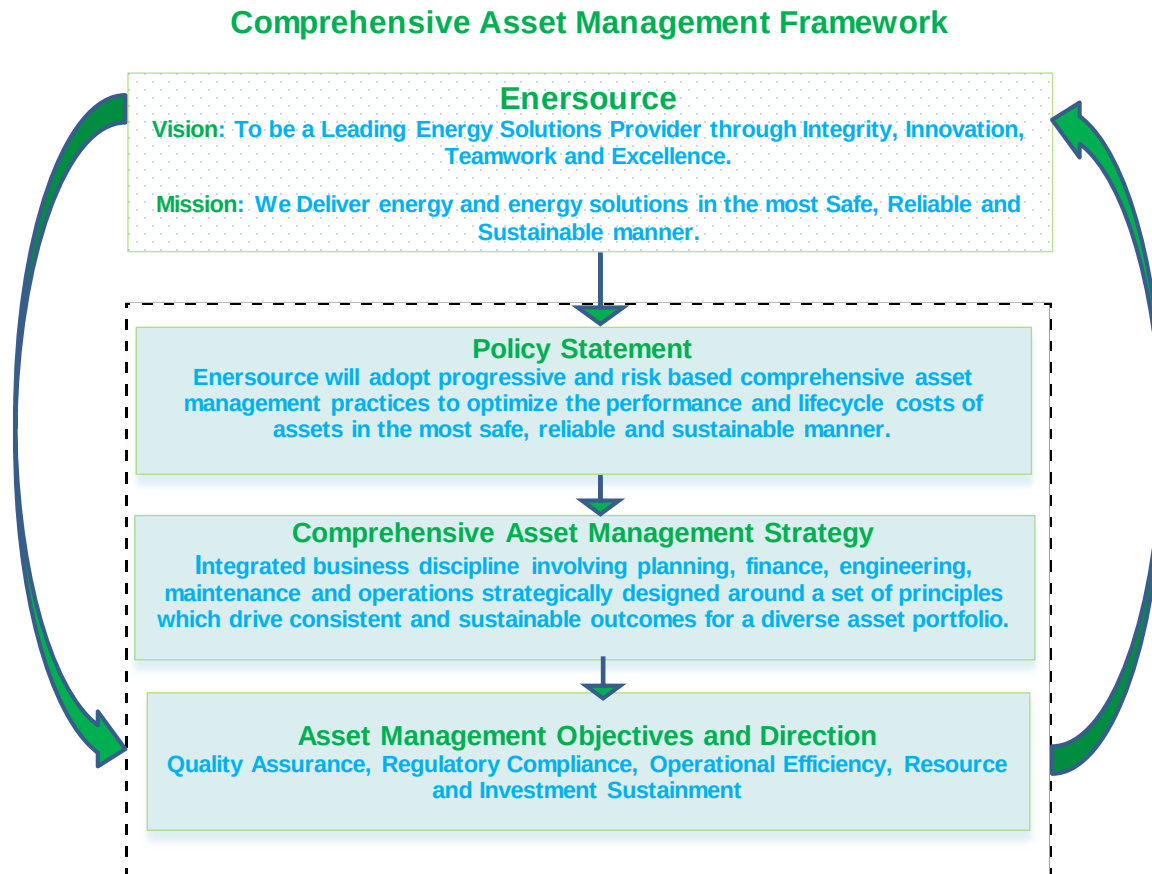


Figure 1. Enersource Asset Management Framework.

Asset Management Implementation and Components

Enersource views its current asset management system as a set of tools, policies, plans, and business processes used by the Company to direct, coordinate and control investment activities. It provides Enersource with a method to reduce and mitigate risk and give assurance that the asset management objectives will be achieved on a consistent basis. The initial component of the asset management system is the Strategic Plan.

The Strategic Plan has five main focus areas which Enersource takes into account when establishing its yearly business plans and are as follows:

- Corporate Risk
- Stakeholder Engagement
- Workforce
- Value Creation
- Asset Management

Enersource uses these five key focus areas to establish the short term and long term organizational objectives which are used to align the business planning activities to the overall corporate Strategic Plan.

Enersource's Senior Management and Executive Advisory Committee ("EAC") establishes the objectives and goals of the organization which are then approved at a summary level by the Board of Directors and are based on the overall Strategic Plan. The EAC is made up of all of Enersource's Executive Vice Presidents, Vice Presidents and Director level staff. This top down objective-setting approach is to ensure that when detailed plans are created, they are in alignment with the objectives and values set out and approved by the Board of Directors.

Enersource currently evaluates its business plan and investment projects and programs against the following significant business values:

- Regulatory/Public Policy Responsiveness
- Operational Effectiveness/Safety
- Customer Focus
- Financial Performance

In order to establish an investment plan that is realistic and takes into consideration customer expectations and preferences, public policy responsiveness and stakeholder requirements, Enersource prioritizes projects and programs based on the business values listed above. Projects are prioritized based on which investments have the greatest impact on the business values. Assuming there were no constraints, all investments with a positive impact on the business values would be approved. Due to resource constraints (e.g. appropriate funding, labour availability, information technology support) and other considerations such as the impact on the customer, other stakeholders, and the environment, projects and programs are selected and prioritized based on supplemental quantitative and qualitative analysis.

After the top down objectives have been approved, the detailed capital budgeting process begins with an assessment and evaluation of Enersource's current and future distribution, intangible, and general plant asset needs and requirements. Recommendations are then made on the timing of asset additions, replacements and disposals, taking into consideration various factors such as strategic or top down objectives, operational requirements and constraints, asset condition, age, criticality, reliability

information, new capacity or regulatory requirements, as well as environmental and other stakeholder impacts.

Each recommendation is assessed and draft business cases are prepared by the main business unit sponsors, along with other key stakeholders, for each proposed project or program. Each business case includes a description of the investment driver, scope, forecasted cost, potential benefit, and risk mitigation anticipated from each project or program.

Projects and programs are selected by assessing and balancing labour availability and funding with other needs and constraints within each division and across the organization. The recommendations are further prioritized by performing risk evaluations that identify the consequences and impacts that the project or program will have on Enersource's business values.

Each proposal is reviewed to ensure alignment with Enersource's overall asset management strategy and determine if the project or program is realistically achievable in the timeframe proposed.

After the selected draft proposals have been reviewed for overall alignment, projects and programs are consolidated into the yearly DSP. The consolidated draft DSP is presented to Enersource's Asset Investment Council "AIC" (as per Enersource's CAMP). The appropriate signing authority within each line of business approves each of the respective capital asset project or program proposals to be presented to the Board of Directors.

Any single capital or intangible expenditure proposed in the DSP in excess of \$2,500,000 (above the original capital budget) must receive separate approval from the Board of Directors before any action can be undertaken. Any capital or intangible expenditures that, in aggregate, are in excess of \$5,000,000 (but do not necessarily increase the overall capital budget), that are transferred or redirected between established investment categories during the calendar year, must also receive separate approval from the Board of Directors before any transfer or action can be undertaken.

The annual DSP is first approved in principle by the Board of Directors. Once this approval in principle has been received, the DSP is incorporated into the overall annual business plan which receives formal approval through a resolution of the Board. The annual capital investment plan includes all electricity infrastructure, equipment, building improvements, land and intangible asset requirements (e.g., software and permanent easement rights).

Adjustment to Approved Capital Plan - Overview:

While the annual approved DSP is a consolidation of Enersource's business cases and proposals which have been reviewed, assessed, evaluated, planned and prioritized based on numerous quantitative and qualitative analyses, the actual execution of the plan may be different due to things such as:

- Changes in customer and stakeholder requirements (e.g., regional plans, unexpected growth, unplanned road widening, etc.);
- Changes in business priorities from new or more relevant information;
- Changes in external requirements (e.g., government directives, new technical standards, environmental regulations); and
- Major events (e.g., storms, equipment failures, etc.).

The adjustment to the approved capital plan process follows the same initial steps as described in the planning process. The next step in the Adjustments to the Approved Plan process is to assess the resource requirements of the new or revised proposal against the original Approved Plan.

The following two issues then must be resolved:

1. If the proposal can be executed within the budgeted category by the business unit sponsor and the Vice President, Asset Management Strategy then the proposal is accepted and communicated to the appropriate signing authority; or
2. If the proposal cannot be executed within the budgeted category by the business unit sponsor and the Vice President, Asset Management Strategy then an alternative proposal is made to the AIC for consideration. If the recommendation is accepted, the proposal is approved by the appropriate signing authority.

In the case that an individual adjustment proposal is in excess of \$2,500,000 (above the original capital budget) the revised proposal must be sent to the Board of Directors for approval. If and when it is determined that the changes, transfers and / or redirections are, in aggregate, over \$5,000,000 (but not necessarily above the original capital budget), a summary of the proposed Adjustments to the Capital Plan must be sent to the Board of Directors for approval.

Asset Life Cycle Management – Process and Procedures:

The planning process includes evaluations, which are completed for each asset class and for each project or program. The evaluations involve identifying the significance of each asset, project and program and how risk affects the main business value categories, as well as evaluating the consequences of not proceeding with new capital or sustainment investments.

Project Evaluation

In order to efficiently and effectively prioritize projects and programs included in the yearly DSP, Enersource performs assessments against the associated business values listed above. The objective is

to eliminate, control or mitigate risks associated with each business value and to ensure that the highest risks are addressed first. The Project Evaluation phase defines project alternatives and creates business cases in support of the feasible alternatives. Unless mandated, project alternatives are evaluated based on their impact to Enersource's business values.

Project concepts are first reviewed to determine if they are a mandatory project. Mandatory projects are typically dictated through the OEB's Distribution System Plan or the Ontario Government's *Electricity Act*. They range from customer connections, including the connection of renewable generation, to line relocations, to restoring power in a timely fashion.

Non-mandated project concepts are reviewed and evaluated and possible alternatives are developed which will meet the desired objectives of the project. This evaluation is done through a business case development. Project alternatives are then scored by identifying their risk and/or benefit as it relates to Enersource's business value.

Project Prioritization

The Project Prioritization phase ranks each project based on their value and allows for all projects to be evaluated based on the same criteria to determine what projects will provide the most value to the business while minimizing the risks. A Preliminary Project List is created based on the prioritization process and understanding of risk/impact if the proposed project is not approved. The project list takes into account available funds and resources to complete the work. The proposed investment projects and programs are reviewed by Enersource's Executive Management Team before proceeding to execution. This ensures that Corporate Strategic Objectives are being met through the proposed investment plan. This overall process ensures Enersource exhibits prudent decision-making in its capital planning.

Execution

The Execution phase follows Enersource's internal project management methodology which provides specific guidelines, procedures, work instructions, and industry best practices that will allow Enersource personnel to perform project work in an efficient, effective, and safe manner.

Continuous Improvement

The next stage of the asset management system is to review the actual results achieved from the execution of the projects and programs. Enersource has adopted an asset management conformance and continuous improvement framework as illustrated below in **Figure 2**.

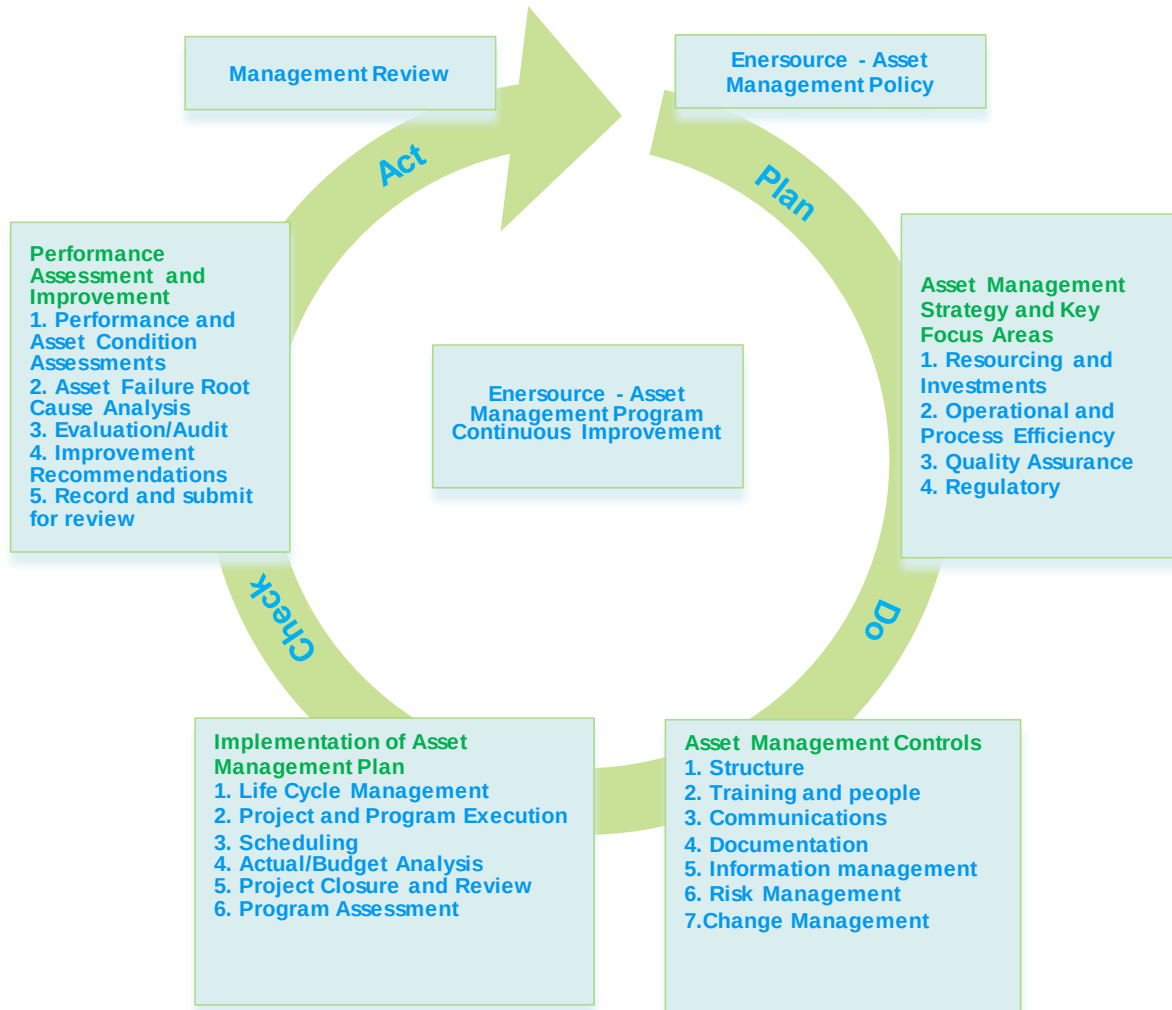


Figure 2. Enersource Continuous Improvement Framework.



PROJECT BUSINESS CASE	
PROJECT NAME:	Integrated Operating Model (IOM) Upgrade
PROGRAM NAME:	Integrated Operating Model (IOM) Upgrade
BUSINESS UNIT:	C0581 - ENGINEERING & ASSET SYSTEMS
SPONSOR:	Ramez Hakeem
INITIATOR:	Amy Hime
DEPARTMENTS INVOLVED:	IT - Operational Technology Systems, Asset Operations
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0581-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> The Integrated Operating Model (IOM) is a computer-based system that provides a single user interface for monitoring the grid, allowing for faster, more informed decision-making. The IOM consolidates information on location and attributes of distribution equipment, real-time crew location, and active outages. The IOM also performs the requirements of an Outage Management System (an OMS), which uses outage probability modeling to assist the Control Room Operators in determining the most likely source of an outage and allowing them to prioritize restoration efforts. At Enersource, the type, duration, and cause of each outage is recorded by the Control Room Operators in the IOM and this information is the source of the reliability statistics. If equipment fails in the field, a follow-up report is created in the IOM, which is used for tracking and prioritizing follow-up activities. In addition to being used as the basis for reliability statistics, the outage information stored in the IOM is used to investigate the worst-performing feeders and to identify low reliability areas. The IOM tracks all activities, outages and problems associated with the power system, including information on equipment failures. Each record includes information on the type of equipment that has failed, its location in the field, the duration, and cause of the outage, as well as, the number of customers affected. This budget provides ongoing upgrades to the IOM applications in order to ensure continued support from the software provider, maintain integration with other applications, and provide new functionality to support the business. Upgrades are scheduled for 2016, 2019 and 2020. All IOM applications will be impacted including InService, I/NetViewer, Control Room Logger, Siemens DSPF, I/Alarm, Oracle, and the middleware required to support the interfaces to other corporate systems. The overall budget required for 6 years is \$750,000.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

All critical IT systems must be upgraded on a regular basis in order to ensure that they are supported by the vendor. The IOM is a mission-critical system utilized by the Control to monitor and manage the grid. Additionally, each upgrade brings new functionality and improvements to existing commands.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Upgrade IT system.

OPTION 2: Allow system to fall out of compliance.

OPTION 3: Purchase new system.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Due to the importance of the system to the organization, allowing the system to fall out of support is considered a high risk. Purchasing a new system would be very challenging given the complexity of the functionality, data model and interfaces, and the costs and timing of a new implementation. Upgrading the system minimizes risk and provides the most cost-effective option.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required as per IT infrastructure road map
	If project is mandatory, can this project be deferred? Required – Deferral of project not recommended. Project required to proceed and will displace projects in future years.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> The IOM impacts the ability to respond during outages and provides the data necessary to respond to customer inquiries quickly.
	Customer Satisfaction Does this project add Customer Value? 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> The IOM provides the Operators, Customer Care and the Reliability team more information about incidents, outages and customers. This allows the employees to communicate effectively with customers.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 8 - Positive impact on brand <u>Support:</u> Data gathered from the IOM allows for analysis and planning for maintenance programs and preventative projects.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> The system allows for quicker identification of the root cause of system outages, which in turn allows for faster resolution. During switching operations, better decisions can be made which can prevent premature aging of equipment or the accidental "dropping" of customers. Data gathered by the system allows for root cause analysis of issues and preventative maintenance programs, and prioritization of rebuild projects.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: October, 2016
	Urgency of implementation? < 3 months And/or enter specific deadline/implementation date: Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? Loss of vendor support.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: Select from drop-down menu	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$125,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 10 years	What type of assets are being replaced? IT

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Spend for this program for all years:

SCHEDULE:

2016 (4th Qtr.)	\$ 125,000	(V9.3)
2017 (1st Qtr.)	\$ 125,000	
2019 (1st Qtr.)	\$ 250,000	(V9.4)
2020 (3rd Qtr.)	\$ 250,000	(Vx)
TOTAL:	\$ 750,000	

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Select from drop-down menu</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$125,000</u> <i>Variance:</i> <u>(\$125,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required as per IT infrastructure road map</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...	Does the project improve a Customer Service ESQR metric? Select from drop-down menu
	Customer Satisfaction <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> Comments...	Does this project add Customer Value? Select from drop-down menu
	Reputational Risk <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - Positive impact on brand <u>Support:</u> Comments...	Does this project reduce or eliminate a reputational risk? Select from drop-down menu

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...	This projects mitigates exposure that could cause: Select from drop-down menu
	Environmental Impact/risk <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...	This projects mitigates exposure that could cause: Select from drop-down menu
	System Reliability <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...	This project maintains or improves system reliability: Select from drop-down menu
	System Expansion <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...	This project increases system capacity: Select from drop-down menu
	System Renewal <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...	This project is for replacement of distribution assets where: Select from drop-down menu

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	AM/FM/GIS Upgrade
PROGRAM NAME:	AM/FM/GIS Upgrade
BUSINESS UNIT:	C0581 - ENGINEERING & ASSET SYSTEMS
SPONSOR:	Ramez Hakeem
INITIATOR:	Amy Hime
DEPARTMENTS INVOLVED:	IT - Operational Technology Systems, Asset Management Strategy
DATE SUBMITTED:	Sept. 15, 2015
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0581-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> The Automated Mapping/Facilities Management/Geographical Information System (AM/FM/GIS) captures both graphical and database information regarding Enersource's field equipment. A map of the City of Mississauga including streets and lots is maintained, with plant information reflected in its approximate location. Also included in the data model are non-plant items such as municipal addresses and easements. In total, Enersource has information for 980,000 plant and geographical items. Employees can quickly and easily locate an item of plant or a customer address on the map and can tell at a glance the equipment configuration in the area. Additionally, the maintenance of a database allows for the generation of reports regarding the total number and type of each transformer, pole or other equipment. The system currently has approximately 180 users throughout the organization including both field and internal personnel. Since 2008, the AM/FM/GIS model has also been the base data for the mission-critical Integrated Operating Model (IOM) system used by the Control Room Operators to monitor and manage the grid. G/Electric is the core software for our AM/FM/GIS mapping system. This budget provides ongoing upgrades to the AM/FM/GIS applications in order to ensure continued support from the software provider, maintain integration with other applications, and provide new functionality to support the business. A minor upgrade is scheduled for 2016 and 2021, with a major upgrade scheduled for 2019. All AM/FM/GIS applications will be impacted including G/Electric (G/Administrator, G/NetViewer, G/MobileViewer), Mobile Link, Oracle, and the middleware required to support the interfaces to other corporate systems. The overall budget required for 6 years is \$430,000.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

All critical IT systems must be upgraded on a regular basis in order to ensure that they are supported by the vendor. The AM/FM/GIS system is considered to be a critical system to the organization. Additionally, each upgrade brings new functionality, and improvements to existing commands.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Upgrade IT system.

An upgrade would ensure that Enersource was supported by the vendor for all issues and in addition would receive new functionality.

OPTION 2: Allow system to fall out of compliance.

If the system is allowed to fall out of compliance, software issues that arise must be resolved in-house. Since the software is a commercial package, it is frequently not possible to solve problems without vendor involvement because the code is compiled and not accessible.

OPTION 3: Purchase new IT system.

The purchase of a new system would cost in excess of \$1M excluding the intangible costs of change management. The AM/FM/GIS system is the backbone IT system for the Asset Operations teams and therefore the change management aspect of a new system cannot be underestimated. Additionally, the interface to the Control Room IOM is a commercial product and as such, is supported by the vendor. Finding a vendor capable of providing a commercial interface with the level of performance that is now available would be difficult, if possible. Custom interfaces to our JDE and CC&B implementations would have to be re-written if another system was purchased.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Due to the importance of the system to the organization, allowing the system to fall out of support is considered a high risk. Purchasing a new system would be very challenging given the complexity of the functionality, data model and interfaces, and the costs and length of time required to implement. Upgrading the system minimizes risk and provides the most cost-effective option.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required as per IT infrastructure road map
	If project is mandatory, can this project be deferred? Required – Deferral of project not recommended. Project required to proceed and will displace projects in future years.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> The AM/FM/GIS system impacts the ability to respond during outages (ESQR - Emergency Response) because it provides the underlying infrastructure for the IOM. It also provides the data necessary to respond to customer inquiries quickly (ESQR - Written Response). If the system is no longer supported, this information will eventually become obsolete and the interface to the IOM left unsupported.
	Customer Satisfaction Does this project add Customer Value? 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> AM/FM/GIS provides the data for the customer facing Outage Map and for the IOM system, both of which are used for communication to the customers.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Data gathered from the AM/FM/GIS allows for analysis and planning for maintenance programs and preventative projects.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 5 - Medical aid injury <u>Support:</u> Timely access to accurate, up-to-date records of underground equipment provides a safer environment for our crews and the public.
	Environmental Impact/risk This projects mitigates exposure that could cause: 3 - Low environmental impact <u>Support:</u> The system allows us to track the location of PCB transformers, and plan for their removal.
	System Reliability This project maintains or improves system reliability: 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> AM/FM/GIS impacts the response time during outages because it assists in the provision of accurate, up-to-date records.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: October, 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? Lack of vendor support.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed?

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: Select from drop-down menu	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$70,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 10 years	What type of assets are being replaced? IT

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Spend for this program for all years:

SCHEDULE:

2016 (4th Qtr.)	\$ 70,000	(V10.2.1)
2017 (1st Qtr.)	\$ 70,000	
2019	\$220,000	(V10.3)
2021 (4th Qtr.)	\$ 70,000	(V10.3.x)
TOTAL:	\$430,000	

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Select from drop-down menu</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$70,000</u> <i>Variance:</i> <u>(\$70,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required as per IT infrastructure road map</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...	Does the project improve a Customer Service ESQR metric? Select from drop-down menu
	Customer Satisfaction <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> Comments...	Does this project add Customer Value? Select from drop-down menu
	Reputational Risk <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...	Does this project reduce or eliminate a reputational risk? Select from drop-down menu

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medical aid injury <u>Support:</u> Comments...	This projects mitigates exposure that could cause: Select from drop-down menu
	Environmental Impact/risk <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Low environmental impact <u>Support:</u> Comments...	This projects mitigates exposure that could cause: Select from drop-down menu
	System Reliability <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> Comments...	This project maintains or improves system reliability: Select from drop-down menu
	System Expansion <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...	This project increases system capacity: Select from drop-down menu
	System Renewal <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...	This project is for replacement of distribution assets where: Select from drop-down menu

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	SmartPlant Foundation Upgrade
PROGRAM NAME:	SmartPlant Foundation Upgrade
BUSINESS UNIT:	C0581 - ENGINEERING & ASSET SYSTEMS
SPONSOR:	Ramez Hakeem
INITIATOR:	Amy Hime
DEPARTMENTS INVOLVED:	IT
DATE SUBMITTED:	Sept. 15, 2015
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0581-3

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The SmartPlant Foundation system is the Engineering document management system, allowing for the creation and maintenance of construction drawings, substation drawings, easements and other legal agreements related to equipment and property access. There are currently 50,000 documents housed in the system and access to them is granted or refused based on the type of drawing, the identity of the requestor, and the life-cycle status of the document. The system is also used to issue unique location numbers for transformers and switchgear and is interfaced to the Automated Mapping/ Facilities Mapping/Geographical Information System to ensure nomenclature integrity. An interface to the JD Edwards Enterprise Resource Planning System contributes to record accuracy.

The system provides full workflow functionality and these workflows are used to coordinate approximately 20 business processes related to records to ensure their timely and accurate update. There are 75 users of the system.

This budget provides ongoing upgrades to the SPF applications in order to ensure continued support from the software provider, maintain integration with other applications, and provide new functionality to support the business. Upgrades are scheduled for 2016, 2018 and 2021. All SPF applications will be impacted including the Foundation, SmartPlant Markup, Oracle, and the middleware required to support the interfaces to other corporate systems. The overall budget required for 6 years is \$960,000.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Upgrade IT system.

An upgrade would ensure that Enersource was supported by the vendor for all issues and in addition would receive new functionality.

OPTION 2: Allow system to fall out of compliance.

If the system is allowed to fall out of compliance, software issues that arise must be resolved in-house. Since the software is a commercial package, it is frequently not possible to solve problems without vendor involvement because the code is compiled and not accessible.

OPTION 3: Purchase new IT system.

While the basic functionality of the document management software is available in other commercial products, some aspects of the product are unique to SPF and would have to be completely custom-built if another product were implemented, for example, issuance of device numbers, and the ability to associate drawings to JDE work orders and AM/FM/GIS area numbers. The SPF system is the backbone IT system for the Asset Operations and Asset Strategy teams for engineering document management and workflows and therefore the change management aspect of a new system cannot be underestimated. Custom interfaces to our JDE and AM/FM/GIS implementations would have to be re-written if another system was purchased.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Due to the importance of the system to the organization, allowing the system to fall out of support is considered a high risk. Purchasing a new system would be very challenging given the complexity of the functionality, data model and interfaces, and the costs and length of time it would require for a new implementation. Upgrading the system minimizes risk and provides the most cost-effective option.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required as per IT infrastructure road map
	If project is mandatory, can this project be deferred? Required - Deferral of project not recommended and will impact the schedule for multi-year programs.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> The SPF system impacts the ability to respond during outages (ESQR - Emergency Response). It also provides the data necessary to respond to customer inquiries quickly (ESQR - Written Response). If the system is no longer supported, the information will eventually become obsolete and inaccessible.
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Data gathered from the SPF system allows for analysis and planning for maintenance programs and preventative projects.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 5 - Medical aid injury <u>Support:</u> Timely access to accurate, up-to-date records of underground equipment provides a safer environment for our crews and the public.
	Environmental Impact/risk This projects mitigates exposure that could cause: 3 - Low environmental impact <u>Support:</u> The system allows us to track the location of PCB transformers, and plan for their removal.
	System Reliability This project maintains or improves system reliability: 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> SPF impacts the response time during outages because it assists in the provision of accurate, up-to-date records.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January, 2016
	Urgency of implementation? Select from drop-down menu
	And/or enter specific deadline/implementation date: June, 2016
	What is the impact of deferring or not meeting the specified deadline date? Lack of vendor support.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed?

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount
	<u>Support:</u> SPF provides a secure, centralized location for engineering records allowing for quick look-up of critical information. Additionally, the rules and workflows in place ensure that records are more accurate and up-to-date, ensuring better and more accurate decision-making. Since this is an upgrade project in order to stay on a current and supported version of software, the benefits relate to risk avoidance as opposed to cost savings.	
	One-Time Costs	This project will incur/create one-time costs of: \$320,000
	<u>Support:</u> 2016 component is \$320K; see below for spend in future years.	
	Ongoing Costs	This project will incur/create ongoing costs of:
	<u>Support:</u>	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 5 years What type of assets are being replaced? IT Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Spend for this program for all years:

2016	\$ 320,000	(V2014 R2)
2018	\$ 320,000	(Vx)
2021	\$ 320,000	(Vx)
TOTAL:	\$ 960,000	

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$320,000</u> <i>Variance:</i> <u>(\$320,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required as per IT infrastructure road map</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medical aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Low environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Miscellaneous Engineering Software
PROGRAM NAME:	Miscellaneous Engineering Software
BUSINESS UNIT:	C0581 - ENGINEERING & ASSET SYSTEMS
SPONSOR:	Ramez Hakeem
INITIATOR:	Amy Hime
DEPARTMENTS INVOLVED:	IT - Operational Technology Systems, Asset Operations, Asset Management Strategy
DATE SUBMITTED:	Sept. 15, 2015
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0581-4

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> If software is in use, it is legally required to be licensed. Employees are hired throughout the year in the Asset Management Strategy, Asset Operations divisions or IT - Operational Technology Systems (OTS) who require software to perform their job functions. Additionally, employees' job descriptions may change, which may alter their software needs. This budget provides additional licenses for applications already owned by Enersource, or new system administrative software required by the OTS department.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

As new employees are hired, licenses are purchased. Additionally, a review is done twice a year to ensure that enough licenses are available in cases where job functions and therefore software usage changes.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Acquire software as requested by employees.**

OPTION 2: **Review requirements thoroughly prior to purchase.**

OPTION 3: **Investigate concurrent use and other cost-saving licensing models for applications.**

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Since this is a legal requirement, Enersource is mandated to comply with licensing requirements. However, an approval process must be undertaken before the software is purchased whereby there is a thorough review of the requirements. Often there are multiple license types with tiered costs per application, and a lower cost product can be purchased and still provide the benefits needed (option 2). Also, depending upon the software licensing model, licenses are shared (concurrent use) where possible in order to minimize costs. Applications that require an Oracle database are configured in such a way as to minimize the server size, since server size is one way in which fees are determined. (option 3)

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Enersource is committed to ensuring that the law is followed in all respects. It is built into our Code of Conduct.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation?	Yes
	Anticipated start date:	Ongoing
	Urgency of implementation?	6 month to 1 year
	And/or enter specific deadline/implementation date:	2016
	What is the impact of deferring or not meeting the specified deadline date?	A fine could be imposed by the software vendors.
	What level of uncertainty is associated to implementation (unknowns or variables)?	Low
	Do other projects rely on this project being completed?	

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount
	<u>Support:</u>	
	One-Time Costs	This project will incur/create one-time costs of: \$30,000
	<u>Support:</u>	
	Ongoing Costs	This project will incur/create ongoing costs of: \$9,000
	<u>Support:</u>	
	Estimated licensing and service costs.	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 2 years What type of assets are being replaced? IT Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

SCHEDULE:

2016:

Engineering Analysis Software - \$ 10,000
Corporate Engineering system Software (AM/FM/GIS, IOM, SPF) - \$ 15,000
Administrative Software - \$ 5,000

2017:

Engineering Analysis Software - \$ 10,000
Corporate Engineering system Software (AM/FM/GIS, IOM, SPF) - \$ 25,000
Administrative Software - \$ 5,000

2018:

Engineering Analysis Software - \$ 10,000
Corporate Engineering system Software (AM/FM/GIS, IOM, SPF) - \$ 25,000
Administrative Software - \$ 5,000

2019:

Engineering Analysis Software - \$ 10,000
Corporate Engineering system Software (AM/FM/GIS, IOM, SPF) - \$ 25,000
Administrative Software - \$ 5,000

2020:

Engineering Analysis Software - \$ 10,000
Corporate Engineering system Software (AM/FM/GIS, IOM, SPF) - \$ 25,000
Administrative Software - \$ 5,000

PROJECT APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$30,000</u> <i>Variance:</i> <u>(\$30,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$9,000</u> <i>Variance:</i> <u>(\$9,000)</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required to become or remain compliant with applicable legislation and/or regulation</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on Customer Service Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Helps preserve brand Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No safety risk Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - None Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on customer minutes of outage Support: Comments...
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No Impact on system capacity Support: Comments...
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: 0 - ACA health index "Very Good" or N/A Support: Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



PROJECT BUSINESS CASE	
PROJECT NAME:	IOM Enhancements
PROGRAM NAME:	IOM Enhancements
BUSINESS UNIT:	C0581 - ENGINEERING & ASSET SYSTEMS
SPONSOR:	Chris Hudson
INITIATOR:	Amy Hime
DEPARTMENTS INVOLVED:	Asset Operations, IT - Operational Technology Systems
DATE SUBMITTED:	Sept. 16, 2015
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0581-5

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> The Integrated Operating Model (IOM) is a computer-based system that provides a single user interface for monitoring the grid, allowing for faster, more informed decision-making. The IOM consolidates information on location and attributes of distribution equipment, real-time crew location, and active outages. The IOM also performs the requirements of an Outage Management System (an OMS), which uses outage probability modeling to assist the Control Room Operators in determining the most likely source of an outage and allowing them to prioritize restoration efforts. At Enersource, the type, duration, and cause of each outage is recorded by the Control Room Operators in the IOM and this information is the source of the reliability statistics. If equipment fails in the field, a follow-up report is created in the IOM, which is used for tracking and prioritizing follow-up activities. In addition to being used as the basis for reliability statistics, the outage information stored in the IOM is used to investigate the worst-performing feeders and to identify low reliability areas. The IOM tracks all activities, outages and problems associated with the power system, including information on equipment failures. Each record includes information on the type of equipment that has failed, its location in the field, the duration, and cause of the outage, as well as, the number of customers affected. Three major and several minor projects have been identified to build on the existing functionality of the IOM in order to provide additional information for the Operators to manage the grid, better customer communication tools, additional trouble analysis and restoration capability, and a safer work environment. The overall budget required for all projects including software, services and internal costs is \$1,155,000.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Three major projects and several smaller initiatives planned to expand on the existing functionality of the core IOM and the peripheral modules in order to provide more benefits to the organization. Details of the background, problems to be addressed or new functionality are outlined in the individual business cases attached.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Provide IOM system enhancements.**

OPTION 2: **Maintain current functionality.**

OPTION 3: **Complete some of the projects.**

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

See the attached business cases for chosen solutions. While the projects will be executed independently, together they make up a program that represents the IT strategy for the Integrated Operating Model. There are synergies to be gained through these projects when completed as an overall unit, and therefore, it is not recommended that some elements of the plan be excluded.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs
	<u>Support:</u> Projects such as the Integration with IVR will enable Operators to more quickly identify the cause of outages thereby restoring power more efficiently (Emergency Response). Better and more accessible information will allow for quick turnaround to customer inquiries through implementation of the Advanced Control Room Logger (Written Response).	
	Customer Satisfaction	Does this project add Customer Value? 10 - Direct positive impact that will be reflected on next customer survey
	<u>Support:</u> The Integration with IVR project will have a direct affect on the customer experience. The Advanced Control Room Logger project will allow for better communication with large customers.	
	Reputational Risk	Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand
	<u>Support:</u> The Enhanced Alarming project will ensure that important alarms are not missed. There are several reliability- and safety-related projects including Mobile Deployment, SCADA Control, Schematics, and several others. Reliability and safety are significant aspects of the Enersource brand.	

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 5 - Medical aid injury <u>Support:</u> The Automated Switch Planning project will allow switching orders to be tested in a simulated environment, helping to protect crews. Switching at the substations will be clearer and easier with the implementation of the Schematics project. A more simplified work process will be created as a result of the SCADA Control project, reducing the risk of mistakes that could impact crew safety.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Several projects, including Integration to Smart Meters, and Integration with IVR, will contribute to quicker identification of the root cause of system outages, which in turn allow for faster resolution. During switching operations, better decisions can be made which can prevent premature aging of equipment or the accidental "dropping" of customers through the Automated Switch Planning project. Data gathered by the system through these and other projects will allow for root cause analysis of issues, preventative maintenance programs, and prioritization of rebuild projects, all contributing to maintaining and/or improving reliability.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Throughout 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? Productivity, reliability, customer experience impacts.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed?

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 10 - > \$100,000
	<u>Support:</u> Reliability savings as well as productivity improvements for Operators and field crews over the life of the program.	
	One-Time Costs	This project will incur/create one-time costs of: \$435,000
	<u>Support:</u> 2016 component is \$435K; see below for spend in future years.	
	Ongoing Costs	This project will incur/create ongoing costs of: \$7,000
	<u>Support:</u> Ongoing software maintenance.	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 10 years
		What type of assets are being replaced? IT
		Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

SCHEDULE:

- 2016 Automated Switch Planning - \$ 60,000
- IOM Mobile Deployment - Phase 2 - \$ 75,000
- IOM Efficiency Toolkit - \$300,000
- 2017 IOM Integration with IVR - \$180,000
- IOM Mobile Deployment - Phase 3 - \$ 80,000
- Power Outage Message Automation - \$30,000
- 2018 IOM Integration with Smart Metering - \$185,000
- 2019 IOM Schematics - \$85,000
- 2020 IOM SCADA Control - \$150,000
- 2021 IOM Complex Workflow Management - \$ 50,000
- IOM Enhanced Alarming - \$100,000
- IOM Advanced Control Room Logger - \$ 60,000

PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 10 - > \$100,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$435,000 <i>Variance:</i> <u>(\$435,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$7,000 <i>Variance:</i> <u>(\$7,000)</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medical aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT SHEET	
PROJECT NAME:	Automated Switch Planning
PROGRAM NAME:	IOM Enhancements
BUSINESS UNIT:	C0581
SPONSOR:	Chris Hudson
INITIATOR:	Amy Hime
BUSINESS CASE #:	2016-C0581-5A

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The Operators must create and validate switching orders manually. There is no quality-check that can be done in an automated way, which in addition to being time-consuming, is prone to errors. The volume of routine switching orders is large and therefore the manual process impacts their efficiency. This project will provide resources to design and configure the Automated Switch Planning module of the IOM which will enable the ability to perform the switch steps in a simulated environment. Through the software, the devices will be selected automatically from the map and populated into the plan. Existing plans may also be used as the base for new plans. Project costs for internal resources are \$60,000.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Use of the Switch Planning module will save a significant amount of Operator time, particularly with routine switching scenarios. It will also provide a good quality check to ensure that switching steps will work as planned, which will contribute to ensuring crew safety and protection of field equipment.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i> Approximately 1,600 routine switch orders per year are created and 25% of the creation time will be saved by the use of the Switch Planning Module. Payback for the module is therefore estimated to be 1.75 years. In addition to these cost savings, the more important benefit of being able to test the plans in a simulated environment will help to protect both the crews and the equipment.



PROJECT SHEET	
PROJECT NAME:	IOM Mobile Deployment - Phases 2 & 3
PROGRAM NAME:	IOM Enhancements
BUSINESS UNIT:	C0581
SPONSOR:	Chris Hudson
INITIATOR:	Amy Hime
BUSINESS CASE #:	2016-C0581-5B&C

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> Communication between the Control Room Operators and the field crews can be challenging. It has to be done through telephone or by the crews making a personal visit to the Control Room. The field Supervisor does not have the same view of the grid as the Operator while in the field, which also inhibits effective communication. The Operator enters a lot of information on behalf of the crew into the IOM because crews do not have direct access to the system. This project will continue deployment of the IOM to the field, which began in 2015 with the Trouble crews, by providing software and training to the Maintenance crews in 2016, and the Construction crews in 2017.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> The Operators will be able to dispatch work directly to the crew lap-tops wirelessly. Field personnel will be able to see the same map as the Control Room and be able to accept, comment on, and close jobs. Less time will be spent relaying information back and forth including trips to Control Room to obtain maps. Information will be input directly by crews resulting in better accuracy. Crews will be able to organize work better because they will see what is outstanding. Anticipated benefits include minor efficiency gains because of the improved workflow of having field input directly into the system. Reliability improvements are expected because of the crews' and Supervisors' ability to more effectively manage work and a positive impact on safety is also anticipated because of the improved communication with the Operators as they now have a view that is synchronized.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	IOM Efficiency Toolkit
PROGRAM NAME:	IOM Enhancements
BUSINESS UNIT:	C0581
SPONSOR:	Chris Hudson
INITIATOR:	Amy Hime
BUSINESS CASE #:	2016-C0581-5D

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The Integrated Operating Model (IOM) has been in production since 2008 and since that time, many additional modules and features have been added to the application in response to business requirements. The Control Room Operators are now very experienced with the software, and while the product enables them to monitor and manage the grid effectively, they have a number of suggestions for improvements to the system. This project includes internal resources and services.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> The improvements requested would enable the Operators to execute commands more efficiently, saving them several steps in the workflows. Other changes would allow them to emulate field conditions more closely as they operate the system, and therefore provide better data to the organization for decision-making purposes, or to provide that data without so much manual intervention. All of these improvements will ultimately affect costs, and potentially, reliability.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i> The Operators could potentially save up to 10% of their time if these improvements are implemented and consequently, estimated payback for the project is 8 months.



PROJECT BUSINESS CASE	
PROJECT NAME:	Asset Management Initiatives
PROGRAM NAME:	Asset Management Initiatives
BUSINESS UNIT:	C0581 - ENGINEERING & ASSET SYSTEMS
SPONSOR:	James Macumber, Chris Hudson, Ramez Hakeem
INITIATOR:	Amy Hime
DEPARTMENTS INVOLVED:	Asset Management Strategy, Asset Operations, IT - JDE & Enterprise Systems, IT - Operational Technology Systems
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0581-6

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Fifteen projects have been identified over the next 6 years to build on the existing functionality of the JD Edwards, Automated Mapping/Facilities Management/Geographical Information System and SmartPlant Foundation systems, all of which play a role in supporting the asset management strategy. Further integration between the systems and changes and enhancements to existing business processes will be undertaken. Improved operational flexibility, better customer communication, optimization of asset replacement, and productivity improvements are all anticipated benefits. The overall budget required for the projects including software, services and internal costs is \$2,455,000.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> X Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Fifteen projects are planned to expand on the existing functionality of core business systems in order to address a number of business concerns. Details of the background and problems to be addressed are outlined in the individual business cases attached.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Provide JDE, AM/FM/GIS and SPF enhancements.**

OPTION 2: **Maintain current functionality.**

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

See the attached business cases for chosen solutions.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Better and more accessible information will allow for quick turnaround to customer inquiries.
	Customer Satisfaction Does this project add Customer Value? 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> Multiple projects are related to customer communications and efficiency.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 8 - Positive impact on brand <u>Support:</u> Projects will provide better information about our assets allowing optimal efficiency in planning and reliability.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: Select from drop-down menu
	<u>Support:</u> Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: Select from drop-down menu
	<u>Support:</u> Comments...	
	System Reliability	This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage
<u>Support:</u> Several projects will contribute to quicker identification of the root cause of system outages, which in turn allow for faster resolution. Better decisions can be made which can prevent premature aging of equipment. Data gathered by the system will allow for root cause analysis of issues and preventative maintenance programs, and prioritization of rebuild projects, all contributing to maintaining reliability.		
System Expansion	This project increases system capacity: Select from drop-down menu	
<u>Support:</u> Comments...		
System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu	
<u>Support:</u> Comments...		

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes	
	Anticipated start date: 2016	
	Urgency of implementation? 1 year to 3 years	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Productivity, reliability, customer experience impacts.	
	What level of uncertainty is associated to implementation (unknowns or variables)? Low	
	Do other projects rely on this project being completed?	

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 10 - > \$100,000
	<u>Support:</u> Automation of workflows will reduce inefficiencies within many business processes. Automation will improve accuracy of information, reducing the amount of ongoing investigation and analysis required to verify data.	
	One-Time Costs	This project will incur/create one-time costs of: \$550,000
	<u>Support:</u> 2016 component is \$550K; see below for spend in future years.	
	Ongoing Costs	This project will incur/create ongoing costs of: \$50,000
	<u>Support:</u> Ongoing costs relate to software maintenance costs for new modules.	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 10 years What type of assets are being replaced? IT
		Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

SCHEDULE:

2016:

AM/FM/GIS Subtransmission Conversion - \$70,000
Transformer Load Analysis Integration to AM/FM/GIS - \$20,000
Major Equipment Location Tracking - \$ 95,000
Asset Inspection Enhancements - \$65,000
Asset Maintenance Management - Phase 1 (Substations) - \$300,000

2018:

Asset Barcoding & AM/FM/GIS Integration (IT component only) - \$ 45,000
AM/FM/GIS Transformer Asset Life Cycle Remodeling - \$145,000
Asset Maintenance Management - Phase 1a (Substations) - \$300,000
Inventory Forecasting/Planning Solution - \$100,000

2019:

Asset Maintenance Management - Phase 2 (Transformers/Switchgear) - \$200,000
Project Management/Scheduling - \$200,000
Shift Worker Scheduling - \$ 30,000
Ordering Inventory from the Field - \$ 30,000

2020:

Asset Maintenance Management - Phase 2a (Transformers/Switchgear) - \$200,000
Major Equipment Location Tracking - Phase 2 - \$205,000
Project Estimation Application \$150,000

2021:

Asset Maintenance Management - Phase 2b (Transformers/Switchgear) - \$200,000

PROJECT APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 10 - > \$100,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$550,000 <i>Variance:</i> <u>(\$550,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$50,000 <i>Variance:</i> <u>(\$50,000)</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - Positive impact on brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT SHEET

PROJECT NAME:	AM/FM/GIS Subtransmission Conversion
PROGRAM NAME:	Asset Management Initiatives
BUSINESS UNIT:	C0581
SPONSOR:	James Macumber
INITIATOR:	Amy Hime
BUSINESS CASE #:	2016-C0581-6A

PROJECT DESCRIPTION/SUMMARY

Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).

In AM/FM/GIS, the subtransmission equipment is on a separate layer. An important tie-in to the distribution circuits could be missed which could limit operational flexibility and cost time and money. The AM/FM/GIS model requires rework in order to provide clarity when planning and ensure optimum operational flexibility. The current design, which has been in place since the mid-1990's, is overly complex to maintain and operate. This project will provide resources to remodel the system so that there is only one class of distribution features. The overall cost is estimated to be \$70,000 for services and internal resources.

PROJECT BENEFITS / RISKS MITIGATED

Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.

Once there is a single class of distribution features, the placement, leveling, and locate commands, which make up the majority of the daily work for the Corporate Mapping team, will be simplified. Development and maintenance of reporting tools will be much easier and less prone to mistakes. A clear view of the overall distribution network will be provided, without the need to toggle between subtransmission and distribution layers. This is critical when system planning and designing.

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT SHEET

PROJECT NAME:	Transformer Load Analysis Integration to AM/FM
PROGRAM NAME:	Asset Management Initiatives
BUSINESS UNIT:	C0581
SPONSOR:	Chris Hudson, James Macumber
INITIATOR:	Amy Hime
BUSINESS CASE #:	2016-C0581-6B

PROJECT DESCRIPTION/SUMMARY

Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).

Transformer load information, which is obtained through the integration of data from the CC&B system and the AM/FM/GIS system will be available in tabular form in 2015 through the Microsoft BI tool, but in order to plan and execute their work, it is much more important for users to see the transformers on a map and in relation to each other. This project will integrate the transformer load information calculated through the Microsoft BI application to the users of AM/FM/GIS and IOM. The estimated cost for the project is \$20,000 for internal resources.

PROJECT BENEFITS / RISKS MITIGATED

Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.

This project will provide information for system planning purposes but will also give users the ability to communicate quickly and accurately to customers. The Control Room and crews will be able to determine whether a damaged transformer should be upgraded or exchanged "like-for-like".

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT SHEET	
PROJECT NAME:	Major Equipment Location Tracking
PROGRAM NAME:	Asset Management Initiatives
BUSINESS UNIT:	C0581
SPONSOR:	James Macumber
INITIATOR:	Amy Hime
BUSINESS CASE #:	2016-C0581-6C

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> Information about key assets such as transformers and switchgear, is manually copied from JDE to AM/FM/GIS, an inefficient task that increases the risk of data errors. This project will provide automation for the placement of key transformer and switchgear information from Stores to JDE to AM/FM/GIS. The overall project cost is estimated to be \$95,000 for internal resources from the AM/FM/GIS and JDE teams.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> The goals of the project include the reduction of look-up and manual key-in of information critical to the AM/FM/GIS system such as impedance, serial number, manufacturer and manufacture date. It will minimize the need for after-the-fact investigation by the Records Coordinator as to where transformers are, following up with Stores and outside Supervisors. The ultimate goals will be to improve asset records accuracy and reduce manual input through automation.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Asset Inspection Enhancements
PROGRAM NAME:	Asset Management Initiatives
BUSINESS UNIT:	C0581
SPONSOR:	James Macumber
INITIATOR:	Amy Hime
BUSINESS CASE #:	2016-C0581-6D

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> Field inspection information is captured, quality-checked and submitted to the AM/FM/GIS system through the Mobile Link application. However, once repairs are undertaken, there is no ability to capture this information and update the inspection data. This project will provide resource to modify the Mobile Link inspection software so that repair information can be captured and also provide corresponding modifications to AM/FM/GIS to house the information. The overall cost is estimated to be \$65,000.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This project will provide automation and QA tools for end users and support personnel for managing the data and processes surrounding inspection information. This will ensure that the data is in place for the Asset Management and Operations teams so that priority repairs can be planned in the most efficient way possible.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET

PROJECT NAME:	Asset Maintenance Management - Phases 1 and 2
PROGRAM NAME:	Asset Management Initiatives
BUSINESS UNIT:	C0581
SPONSOR:	Chris Hudson, James Macumber
INITIATOR:	Amy Hime
BUSINESS CASE #:	2016-C0581-6H

PROJECT DESCRIPTION/SUMMARY

Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).

There is no centralized location for maintenance information related to substations and their components, and other major assets. Therefore, it is time-consuming to adequately schedule work, view in progress or overdue work, or provide reports for compliance purposes. This project will extend the asset maintenance management system in JDE to use with Substations, transformers and switchgear. This includes collecting inspections data, preventative maintenance scheduling and corrective work. The project will ensure that substation inspections, follow-ups and maintenance are completed and tracked in a system that can be reviewed and reported on. Over the course of 6 years, it is anticipated that \$1.2M will be required for system implementation and refinements, with \$300,000 in 2016.

PROJECT BENEFITS / RISKS MITIGATED

Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.

The implementation of this project will provide a streamlined view of upcoming, in progress, and overdue work so that management can focus on trouble areas. It is expected that reliability will be positively impacted while at the same time, it will allow the EHM team to determine the most efficient approach to achieving the improvements.

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>Totals</u>
Asset Maint Mgmt - Substations	\$ 300,000	\$ -	\$ -	\$ -	\$ -	\$ -	
Asset Maint Mgmt - Transformer&Switch Gear	\$ -	\$ -	\$ 300,000	\$ -	\$ -	\$ -	
Asset Maint Mgmt	\$ -	\$ -	\$ -	\$ 200,000	\$ 200,000	\$ 200,000	
TOTAL	\$300,000	\$ -	\$300,000	\$200,000	\$200,000	\$200,000	\$1,200,000



PROJECT BUSINESS CASE	
PROJECT NAME:	Mavis Asphalt
PROGRAM NAME:	
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	
DEPARTMENTS INVOLVED:	Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This project is to replace sections of the asphalt/concrete curbs at our 3240 Mavis Road facility. The existing asphalt is over 15 years old and is in fair to poor condition. Properly maintained pavement will ensure an even walking surface free of tripping hazards. Enersource acquired the services of an external Engineering firm to provide us an assessment of our 3240 Mavis Road facility. Section 9 of the report indicates that the Pavement and Exterior site features are in fair condition with several areas in poor condition. Attached in this business case is the a section of the report for reference only.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Asphalt paved roadways, surface parking areas and concrete walkways are present throughout the 3240 Mavis property. The last major asphalt rehabilitation was over 15 years ago and there is significant damages and is becoming a safety concern with slips and falls for employees and the public. Water migrates thru the damaged asphalt areas and attacks the sub-grade layer. Rehabilitation of the pavement and its site features are required to ensure a safe work area and for effective surface water management.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Execute pavement and exterior site features per Engineering report**

Per Building Condition Survey report, complete a multi year rehabilitation project to carry out the rehabilitation of the asphalt pavement outlined in the body of the report. The allowance includes removal of previous buried foundation structure, sub-grade repairs, new concrete curbs and asphalt rehabilitation. Work will be scheduled per priority locations and operational concerns.

OPTION 2: **Do nothing**

The result of doing nothing was quickly discounted as the extend of the damages would progressively get worse with yearly freeze and thaw cycles.

A solid asphalt base is required to provide a secure walking surface and to ensure surface water is directed to the appropriate catch basins instead of going to the sub base material.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Execute the pavement and exterior site features per Engineering report

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 5 - Medical aid injury <u>Support:</u> Comments... An uneven and damaged asphalt surface has potential hazards due to trips and falls.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u> Downtown 21 will use more load than we can accommodate due to additional buildings, LRT, etc.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 - 2016
	Urgency of implementation? 3 to 6 months And/or enter specific deadline/implementation date: Q3 2016
	What is the impact of deferring or not meeting the specified deadline date? Deterioration of asphalt will get progressively worse, increasibng the likelihood of trips and falls
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u> 2016 - \$225,000 2017 - \$225,000 2018 - \$250,000 2019 - \$275,000 2020 - \$275,000 2021 - \$275,000	This project will incur/create one-time costs of: \$1,525,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement		
	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition 	

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Asphalt paved roadways and surface parking areas are present throughout the property. A combination of cast-in-place and precast concrete curbs are present on the property. Concrete walkways are also present on the property, particularly along the perimeter of the north and south towards as well as along the west end of the central tower. Areas of unit paver walkways are also present at the south tower. Metal chain-link fencing is generally present along the north, south and west property limits. Landscaping consisting of shrubs, small sized trees and sod areas are present along some of the north and east property limits.

9.2 General Comments and Observations/Recommendations

The fieldwork comprised a visual cursory survey. No probeholes were drilled at this time and a complete set of drawings with regard to the pavement design and/or requirements were not made available for our review.

The following lists some typical examples of deficiencies and/or deterioration which we noted during our site review with regard to the pavements and exterior site features. These examples are not intended to be a complete listing of all the areas affected, but rather to provide an indication as to the types of deficiencies and/or conditions present on site.

1. Asphalt paved roadways and surface parking areas are present throughout the property. Overall, the asphalt pavements present on the property were observed to be in fair condition with several areas in poor condition at this time. During our visual review, we noted several areas of deterioration in the form of cracking and mild settlement within the asphalt pavements (See Photograph Nos. 9-1, 9-2 and 9-3). Some repairs/rehabilitation of the asphalt pavements appear to have been carried out in the past. According to information provided, the demolition and removal of a structure was carried out at the south end of the property (where surface parking area is currently present). Based on information provided, the existing foundations and footings of this past structure were not removed as part of this work. It is unconfirmed at this time as to the full extent and nature of the current conditions present on the site, however during future major asphalt pavement rehabilitation work the removal of these foundations/footings would be quite costly and would require further detailed review to properly capture these costs. As a minimum, we have provided a minimal allowance to carry out some rehabilitation of the asphalt pavements over the next five years, including localized sub-grade repairs as may be required.

2. Localized areas of cracking and deterioration were noted within the concrete curbs and walkways present on the property. These areas should be properly repaired,



particularly the walkways in order to provide an even walking surface free of tripping hazards.

3. Isolated unit pavers present at the south tower were noted to be mildly displaced/shifted. These pavers should be removed and reset to provide an even walking surface free of tripping hazards.

4. A garbage disposal area is present towards the southwest corner of the property. The disposal area generally consists of cast-in-place concrete retaining walls, metal railings as well as a concrete pad. During our visual review, we noted evidence of cracking and surface wear and tear on the concrete pad (See Photograph No. 9-4). Cracking and deterioration was also evident within the concrete retaining walls. Furthermore, areas of pronounced water ponding were noted towards the south end of the garbage disposal area (See Photograph No. 9-5). Based on our visual review, repairs to the garbage disposal area should be carried out in the near future. This work should also include repairs to the remaining areas of deterioration present at the concrete pads located on the property.

5. A concrete retaining wall is present at the west end shipping/receiving area of the warehouse building. During our visual review, we noted evidence of concrete deterioration within the retaining wall (See Photograph No. 9-6). Furthermore, mild surface corrosion was noted on the metal railing installed atop the retaining wall. These components should be properly refurbished.

6. A concrete ramp with stone clad retaining/landscaping walls provides access to the west main entrance/exit of the north tower. Overall, the ramp and walls appear to be in serviceable condition at this time. According to information provided, the ramp walls were refurbished in the past.

7. A metal service lift is present at the west end of the south tower. Areas of mild surface corrosion were noted on the metal lift. In addition, mild surface corrosion was noted on the metal hand rails present adjacent to the lift. Concrete deterioration was also evident at the base of the metal handrails. In addition, evidence of cracking and deterioration of the concrete steps was noted at this vicinity. We have provided a minimal allowance to address these deficiencies.

8. Metal chain-link fencing is generally present along the north, south and west property limits. Overall, the chain-link fencing was noted to be in serviceable condition at this time. No widespread areas of deterioration were noted with regard to the metal fencing. We do not anticipate major repairs be carried out to the fencing in the near future.

9. Localized areas of bare/damaged sod were noted during our visual review, for example at the west end of the central tower. All bare/damaged sod should be properly addressed.





PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$1,525,000 <i>Initial Assessment:</i> \$1,525,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <u>-</u> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <u>Initial Assessment:</u> <u>-</u> <u>Variance:</u> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medical aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Infrastructure and Security Upgrades (Electrical, fire and life safety)
PROGRAM NAME:	Grounds and Building
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	JP Michaud
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing, Health Safety and Environment
DATE SUBMITTED:	September-08-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Enersource currently operates from two locations in Mississauga: 3240 Mavis Road and 2185 Derry Road West. The Mavis Road building was originally constructed in 1963 with additions to the original building in 1970 and again in 1991. The Derry Road location was constructed in 1993. Both buildings require constant evaluation of the existing electrical systems, the fire systems and life safety systems. Based on feedback from service providers and inspections performed upgrades to systems will be made at each location to ensure that each building systems infrastructure is performing properly and providing monitoring of the building ensuring a safe work environment for employees and the public visiting the sites. Projects may include upgrading fire alarm panels, replacement of fire suppression systems, addition of security cameras and upgrades to the existing electrical systems that may be required throughout the year.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The company needs to ensure that its electrical, fire, and life safety systems are in sound working order to ensure the overall safety of employees and others who may visit either of the site owned by the company. Investments need to be made to ensure these systems are in top working order and providing the protection they are intended to provide. Without updating, replacing components of these systems, there is an opportunity for failure in system and the potential for possible harm to building occupants or building contents.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

Status quo. The systems could be left as they currently are with only maintenance to offset any issues that may arise. By taking this approach you run the risk of the systems becoming out of date and an inability to find replacement parts, or situation where the system does not operate as intended in a time when it is required.

Explanation

OPTION 2:

Replace components on the system as they are required through feedback from suppliers or through inspections of the systems. This will ensure components of the system are up to date and less likely to fail. A con of this approach may be you are replacing parts prior to complete failure while they may still have some useful life left on them.

Explanation

OPTION 3:

Explanation

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1:

This is not a satisfactory option because the systems may become obsolete and replacement parts will be unable to be sourced. The system may not operate when it is required to due to the fact the components have not been kept up to date.

Option 2:

Through inspection data and feedback from service providers the option replacing components based on the feedback received is the preferred option rather than waiting for specific pieces to fail when they may represent a safety issue for employees.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR
	<u>Support:</u>	
	Customer Satisfaction	Does this project add Customer Value? 0 - No impact on Customer Service
	<u>Support:</u>	
	Reputational Risk	Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk
	<u>Support:</u>	

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 10 - Potential loss of life <u>Support:</u> Eliminate safety hazards to the public where there are holes in the live equipment that a person may get access or from utility personnel operating unsafe equipment.
	Environmental Impact/risk This projects mitigates exposure that could cause: 3 - Low environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u> Improve reliability, power quality and safe operation of the underground equipment
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u> PMH units allow more transformers to be connected to them.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-15
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q3 2016
	What is the impact of deferring or not meeting the specified deadline date? Potential failure of the system or components of the system.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No.

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 5 - > \$50,000
	<u>Support:</u>	
	One-Time Costs	This project will incur/create one-time costs of: \$1,425,000
	<u>Support:</u> 2016 - \$200,000 2017 - \$200,000 2018 - \$225,000 2019 - \$250,000 2020 - \$250,000 2021 - \$300,000	
	Ongoing Costs	This project will incur/create ongoing costs of:
	<u>Support:</u>	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 15 years What type of assets are being replaced? Electrical, fire and life safety sytems
		Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> 5 - > \$50,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$1,425,000 <i>Initial Assessment:</i> \$1,425,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu <i>Final Assessment:</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Potential loss of life <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Low environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Energy conservation, waste reduction and Health & Safety programs
PROGRAM NAME:	Grounds and Building
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	JP Michaud
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing, Health Safety and Environment
DATE SUBMITTED:	September-08-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-3

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Enersource is continually examining ways to reduce waste, conserve energy, and improve the working environments of the employees of the organization. Through the year various programs will arise that will require capital investment. These programs arise through ideas from employees, management, facilities, or the general public for ways to reduce waste or conserve energy. Enersource's Health, Safety and Environment (HS&E) is constantly working with employees to provide more suitable working environments through an ongoing and active ergonomics program. The HS&E group is continually looking for developing new work stations and adjusting work stations for employees to meet new needs. This program will involve purchasing new work stations, desks, chairs and other office furniture. This program will also address issues raised from Indoor Air Quality and EMF tests such as mold, aged ceiling tiles and carpets.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The development of waste reduction programs, energy conservation programs and ergonomic requirements come from a number of different avenues. Each of the programs, specifically ergonomic programs may require capital investment. By developing ergonomic solutions Enersource ensures proper and comfortable work environments for its employees and ensure the employees are productive and free of strain. Energy Conservation and waste reduction programs help reduce the burden on the environment and are programs that Enersource feels important as a member of the Mississauga community.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

Explanation

Status quo. Employees can continue to utilize existing work stations, and the organization can do nothing with respect to energy management or waste reduction.

OPTION 2:

Explanation

Replace work stations as required and as new options develop. Institute programs that reduce energy consumption and reduce waste.

OPTION 3:

Explanation

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

As programs develop and needs arise, Enersource will institute the programs and purchase the required office furniture and address Indoor Air Quality to ensure employees are productive, safe and comfortable in their work environment and continue to find ways to reduce energy consumption and reduce waste.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> • Maintain customer reliability with reduced outage duration and frequency • Replace end of life assets • Improve reliability, power quality and safe operation of the underground equipment
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> • Improves reliability and power quality for customers
	Reputational Risk Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk <u>Support:</u> Improves reliability and power quality for customers

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 3 - First aid injury <u>Support:</u> Eliminate safety hazards to the public where there are holes in the live equipment that a person may get access or from utility personnel operating unsafe equipment.
	Environmental Impact/risk This projects mitigates exposure that could cause: 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u> Improve reliability, power quality and safe operation of the underground equipment
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u> PMH units allow more transformers to be connected to them.
	System Renewal This project is for replacement of distribution assets where: <u>Support:</u> Per the ACA there are 852 PMH units, average age was 19 years and approximately 32% of the population was 25 years or older. The average Health Index for this asset group was 79%. About 10% of the population was in "poor" or "very poor" condition.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-15
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q3 2016
	What is the impact of deferring or not meeting the specified deadline date? Employees may develop medical issues.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No.

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: 3 - > \$30,000 Support:
	One-Time Costs This project will incur/create one-time costs of: \$1,070,000 Support: 2016 - \$150,000 2017 - \$170,000 2018 - \$175,000 2019 - \$175,000 2020 - \$200,000 2021 - \$200,000
	Ongoing Costs This project will incur/create ongoing costs of: Support:
	Impact on Distribution Rates / Revenue Requirement What is the age of the assets being replaced? 10 years What type of assets are being replaced? Electrical, furniture and plumbing fixtures Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$1,070,000 <i>Initial Assessment:</i> \$1,070,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> 2016 - \$150,000 2017 - \$150,000 2018 - \$150,000 2019 - \$150,000 2020 - \$150,000 2021 - \$150,000
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - First aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Mavis HVAC & Mechanical Upgrades
PROGRAM NAME:	
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	
DEPARTMENTS INVOLVED:	Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-4

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Some of HVAC/mechanical components have reached end of life and needs to be replaced. There are a number of units identified in the Building Condition Survey that need to be replaced to ensure a healthy work environment.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Existing condition of HVAC components have reached end of life and needs to be replaced. There are a number of units identified in the Building Condition Survey that need to be replaced to ensure a healthy work environment. Replacement components will include the boiler, Roof Top Units, heat pumps, condensing units, exhaust fans in the garage and water heaters. A recent Engineering study shows the condition of our HVAC system. See Appendix

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Execute mechanical replacement per Engineering report

Per Building Condition Survey report, complete repairs/replacement of Mechanical components outlined in the body of the report. The allowance includes replacement of Heat pumps, Roof Top Units, Boilers, Water heaters and exhaust fans in the garage.
A good working mechanical system creates the required work environment for staff and equipment to perform at their best.

OPTION 2: Do nothing

Do nothing was considered, however, quickly discounted as this would mean that heating and cooling for the facility would be affected. Exhaust fumes and water in walls are all results of mechanical units such as water heaters and exhaust fans not being replaced at end of life.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Execute mechanical replacement per Engineering report

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 3 - First aid injury
	<u>Support:</u> Comments... An area that does not meet ASHRAE guidelines with building comfort could cause discomfort to employees having to seek medical attention.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u> Downtown 21 will use more load than we can accommodate due to additional buildings, LRT, etc.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation?
	Yes
	Anticipated start date:
	Q2 - 2016
	Urgency of implementation?
	3 to 6 months
	And/or enter specific deadline/implementation date:
	Q4 2016
	What is the impact of deferring or not meeting the specified deadline date?
	Deterioration of mechanical components will get progressively worse, increasing the likelihood of discomfort for staff
	What level of uncertainty is associated to implementation (unknowns or variables)?
	Low
	Do other projects rely on this project being completed?
	No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u> 2016 - \$100,000 2017 - \$100,000 2018 - \$125,000 2019 - \$150,000 2020 - \$175,000 2021 - \$175,000	This project will incur/create one-time costs of: \$825,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)
 See Attachment Building Condition Survey Report for 3240 Mavis Road section 7
 See Attachment for complete list of Mavis Mechanical component conditions at our Mavis facility

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$825,000 <i>Initial Assessment:</i> \$825,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <u>-</u> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - First aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Building Automation System
PROGRAM NAME:	
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	
DEPARTMENTS INVOLVED:	Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-5

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Enersource owns two older buildings that have no building automation system. The goal of this project is to: 1. Higher Energy Efficiency 2. Lower Operating costs 3. Better Indoor Air Quality 4. Increase occupany comfort and productivity	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Enersource owns two facilities (Derry and Mavis) where staff are present on a regular basis. These facilities have no building automation system and it makes it very difficult to find ways to reduce operating costs and improve occupant comfort. Here is a list of benefits brought by a Building Automation System:

1. Higher Energy Efficiency: A BAS will allow us to optimize HVAC efficiency by optimizing start/stop times of occupied periods, using economizers for free cooling, only bring in required amount of outside air during winter and summer months, maintaining ventilation at the most efficient flow rates. It is generally estimated that 10-30% energy savings can be achieved thru scheduled control alone.
2. Lower Operating costs: By operating the HVAC and lighting system more effectively, ie, as required and taking advantage of economizers, we will be reducing the amount of time the equipment is operating. BAS typically saves 15% of the operating costs of the equipment. Also, reduced maintenance costs will occur as we will be running the equipment less and controlling it better reduces wear-and-tear and extends equipment life
3. Better Indoor Air Quality: By having a BAS, temperature, humidity sensors monitor thermal comfort and carbon dioxide, carbon monoxide sensors monitor pollutants and ensures the required minimum fresh air ventilation by controlling ventilation dampers.
4. Increase occupant comfort and productivity: A BAS system is capable of detecting presence of staff and adjusts HVAC and lighting accordingly. This provides optimal zone ventilation, heating and cooling. It provides a profound effect on occupant productivity. This fits the greater intent of indoor air quality as defined by the LEED rating system for green buildings. An example would be a control system can monitor carbon dioxide or Volatile Organic Compounds and initiate ventilation, alarms or other remedial action.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Execute BAS project*

To ensure that we can operate the buildings as efficient as possible and increase Indoor Air Quality, it is recommended that we execute this project over a period of three years.

OPTION 2: *Do nothing*

Do nothing is also an option. However, we will continue to rely on the occupants of the work space to notify facilities staff that Indoor Air Quality is not good and need to be adjusted, sometimes taking days. We will also continue to operate the HVAC and lighting equipment not at their most efficient mode of operations, ie operate only when required.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Execute the installation of a BAS system for the Derry and Mavis facilities

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Comments... An area that does not meet ASHRAE guidelines with building comfort could cause discomfort to employees having to seek medical attention.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u> Downtown 21 will use more load than we can accommodate due to additional buildings, LRT, etc.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 - 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 3 to 6 months Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? We would not be taking advantage of reduced operating costs and reduced occupant complaints by having Facilities staff proactively monitoring the IAQ.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u> 2016 - \$200,000 2017 - \$200,000 2018 - \$200,000 2019 - \$200,000 2020 - \$200,000 2021 - \$200,000	This project will incur/create one-time costs of: \$1,200,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$1,200,000 <i>Initial Assessment:</i> \$1,200,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <u> </u> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Mavis Building Envelope
PROGRAM NAME:	
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	
DEPARTMENTS INVOLVED:	Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-6

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Existing condition of the Mavis building envelope which includes the Windows and Walls have been assessed by an independent Engineering company and it is recommended to perform rehabilitation over the next few years. This required remediation will ensure that moisture does not penetrate the building that would negatively affect the work environment for staff and the public. This remediation work will occur over the next three years starting with the north tower in 2016. See section 3, 4 and 5 of the Building Condition Assessment Survey Report.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The outside walls and windows of the Mavis Building have been identified as needing repairs. A recent assessment from an Engineering consultant ranks the wall as fair to poor condition. Cracking and delamination of the stucco wall was observed. Also, normal service life of sealed insulated glass windows is typically 15 to 20 years. The north tower windows are over 35 years and also ranked as fair to poor condition. See attach Section 3, 4 and 5 of the Engineering study. This project is estimated at \$1,550,000

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Execute mechanical replacement per Engineering report**

Per Building Condition Survey report, complete repairs/replacement of Walls and Windows as outlined in the body of the report. The allowance includes replacement of Insulated Glass Units (Windows), Brick walls and exterior Stucco Finishes.

A good working Building Envelope ensures that moisture is kept outside the building, creating a healthy and safe work environment.

OPTION 2: **Do nothing**

Do nothing was considered, however, quickly discounted as this would mean that the building envelope would be compromised allowing moisture in the building and negatively affecting the integrity of the building structure.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Execute building envelope repairs per Engineering report

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 3 - First aid injury
	<u>Support:</u> Comments... An area that does not meet ASHRAE guidelines with building comfort could cause discomfort to employees having to seek medical attention.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u> Downtown 21 will use more load than we can accommodate due to additional buildings, LRT, etc.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation?
	Yes
	Anticipated start date:
	Q2 - 2016
	Urgency of implementation?
	3 to 6 months
	And/or enter specific deadline/implementation date:
	Q4 2016
	What is the impact of deferring or not meeting the specified deadline date?
	Deterioration of the building envelope components will get progressively worse. This would negatively affect the work environment and the integrity of the building structure.
	What level of uncertainty is associated to implementation (unknowns or variables)?
	Low
	Do other projects rely on this project being completed?
	No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u> 2016 - \$500,000 2017 - \$650,000 2018 - \$400,000	This project will incur/create one-time costs of: \$1,550,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: []	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition []

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)
 See Attachment Building Condition Survey Report for 3240 Mavis Road section 3, 4 and 5

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$1,550,000 <i>Initial Assessment:</i> \$1,550,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <u>-</u> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - First aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Derry HVAC Upgrades
PROGRAM NAME:	
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	
DEPARTMENTS INVOLVED:	Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-7

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> There are 7 Main Roof Top Units at our Derry Road facility that provide heating and cooling to the building. Six of the seven units have passed their service life and this project will see them replaced with new controls.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The 7 Roof Top units located at the Derry facility names RTU #1 to RTU #6 are 21 years old each and RTU #7 is 10 years old.

The recommended service life of rooftop unit air conditioning systems is 15 years according to ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers)

In the past 18 months, extensive issues occurred with most RTU units, operating costs are rising and the equipment is showing signs of fatigue.

Building occupant is negatively affected by numerous RTU unit failures.

It is recommended to replace the 6 RoofTop Units in the next three years where the controls of the system will also be replaced.

The new units will be of higher efficiency that will reduce the overall electricity and natural gas usage. The newer units have higher modulation burner control which can better stage heating, hence, less natural gas is utilized during heating season. The cooling efficiency has improved substantially over older units.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Execute Roof Top Unit Replacement Plan.*

To ensure that we keep operating costs to minimum and to ensure building occupant comfort, it is recommended to replace all RTUs over the next 3 years. This will create a healthy work environment and ensure that the Indoor Air Quality of the facility is acceptable.

OPTION 2: *Do nothing*

Do nothing was considered, however, quickly discounted as this would mean that units would continue to experience numerous failures, operating costs would continue to rise and staff discomfort will increase.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Comments... An area that does not meet ASHRAE guidelines with building comfort could cause discomfort to employees having to seek medical attention.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u> Downtown 21 will use more load than we can accommodate due to additional buildings, LRT, etc.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 - 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 3 to 6 months Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? RTUs would continue to fail and operating costs would continue to increase. Buildign occupant will be negatively affected by having a workspace that is not within ASHRAE Indoor Air Quality recommendations.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u> 2016 - \$500,000 2017 - \$550,000 2018 - \$500,000	This project will incur/create one-time costs of: \$1,550,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: []	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition []

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$1,550,000 <i>Initial Assessment:</i> \$1,550,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <u> </u> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Mavis Building Reno to Middle Tower Main Floor
PROGRAM NAME:	
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	
DEPARTMENTS INVOLVED:	Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-8

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> A detailed Facilities Plan has been accepted by the Enersource Executive team in 2013. The purpose of the Facilities Plan is to restore the function of the Mavis facility to an Operations Centre following the acquisition of the Derry administration building. The Facilities Plan is divided into 13 projects and will be executed over the next few years. This project is for the middle tower renovation that will see renovations of that space to accomodate the Facilities and Fleet department.
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Prior to the acquisition of the new Derry Administration facility, the Mavis facility went without renovations for a number of years due to the lack of staging area because of the high occupancy of the facility.

Now that we have relocated about 150 employees to our new Derry Administration building, the remains of the Mavis facility is not conducive to the requirements of a Utility Operations Centre and is also out dated. The Facilities Plan addresses how to better use the facility to meet business needs.

This project will create a healthier work environment for the Mechanics and the Building Operators. Presently, their offices are located in areas where the air quality is sub-par compared to other office spaces in the building.

The new renovated area will also see the support staff and Supervisors relocated to the same areas as the Mechancis and Building Operators. This will create complete working team that will see efficiencies created as the support staff, paperwork and Supervision will all be in the same work environment.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Execute renovation project per the Facilities Plan.**

Complete this renovation project so that a healthier work environment for the Mechanics and the Building Operators is created. Also, the newly renovated area will create complete teams as the support staff and Supervisors will be relocated to the same areas as the Mechancis and Building Operators.

OPTION 2: **Do nothing**

Do nothing was considered, however, quickly discounted as this would mean that existing areas would continue to be dysfunctional, away from other parts of the organization and be inefficient.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 3 - First aid injury <u>Support:</u> Comments... An area that does not meet ASHRAE guidelines with building comfort could cause discomfort to employees having to seek medical attention.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u>
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 - 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 3 to 6 months Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? The area of work would continue to be dysfunctional, away from other parts of the organization and be inefficient.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u> 2016 - \$225,000	This project will incur/create one-time costs of: \$225,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: []	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition []

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)
 See Attach Mavis Facilities Plan

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$225,000 <i>Initial Assessment:</i> \$225,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <u> </u> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - First aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Mavis Warehouse Wall, Walkway and Trades Training Centre
PROGRAM NAME:	
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	
DEPARTMENTS INVOLVED:	Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-9

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> A detailed Facilities Plan has been accepted by the Enersource Executive team in 2013. The purpose of the Facilities Plan is to restore the function of the Mavis facility to an Operations Centre following the acquisition of the Derry administration building. The Facilities Plan is divided into 13 projects and will be executed over the next few years. This project is for the installation of a wall between the Warehouse and the Garage, installation of a safe walkway for office staff to get to the warehouse and the installation of a trades training area for our crews on non energized electrical equipment.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Prior to the acquisition of the new Derry Administration facility, the Mavis facility went without renovations for a number of years due to the lack of staging area because of the high occupancy of the facility.

Now that we have relocated about 150 employees to our new Derry Administration building, the remains of the Mavis facility is not conducive to the requirements of a Utility Operations Centre and is also out dated. The Facilities Plan addresses how to better use the facility to meet business needs.

This project will:

1. Create a healthier work environment for the Warehouse staff members. The warehouse and the garage are only separated by a chain link fence covered with plastic. Everyday when trucks leave and arrive to 3240 Mavis garage, fumes from the diesel engines travel to the warehouse area and creates an environment filled with diesel fumes. Numerous Indoor Air Quality tests were done showing elevated diesel fumes for the worker. A solid block wall will ensure fumes do not travel to the warehouse area.
2. Create a safe passage for staff to go from the office space to the warehouse area. At present, staff that need to go between the warehouse and the office space must go thru the garage where large vehicles are moving and creates a dangerous area for staff not used to work around large vehicles.
3. The Trades Training area will also see some improvements from the Warehouse Wall as it will now be sheltered from fumes and noise created in the garage area. The new environment of the Trades Training area will be more conducive for training, hence, it will be used more often during inclement weather.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: ***Execute renovation project per the Facilities Plan.***

Complete this renovation project so that a healthier work environment for the field staff, office staff, mechanics and warehouse personnel.

OPTION 2: ***Do nothing***

Do nothing was considered, however, quickly discounted as this would mean that existing areas would continue to be dysfunctional, poor Indoor Air Quality and unsafe area for staff to get between departments.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 3 - First aid injury
	<u>Support:</u> Comments... An area that does not meet ASHRAE guidelines with building comfort could cause discomfort to employees having to seek medical attention.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>
	System Expansion This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 - 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 3 to 6 months Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? The area of work would continue to be dysfunctional, poor indoor air quality and unsafe for staff to get between the warehouse and office environment
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$300,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu	Anticipated Derecognition
		What type of assets are being replaced? Please specify	

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)
 See Attach Mavis Facilities Plan

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$300,000 <i>Initial Assessment:</i> \$300,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <u> </u> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - First aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Mavis Warehouse Offices and Washroom
PROGRAM NAME:	
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	
DEPARTMENTS INVOLVED:	Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-10

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> A detailed Facilities Plan has been accepted by the Enersource Executive team in 2013. The purpose of the Facilities Plan is to restore the function of the Mavis facility to an Operations Centre following the acquisition of the Derry administration building. The Facilities Plan is divided into 13 projects and will be executed over the next few years. This project is for the installation of a pre-fabricated office area for the Warehouse staff with Air-Conditioning and washroom facilities.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Prior to the acquisition of the new Derry Administration facility, the Mavis facility went without renovations for a number of years due to the lack of staging area because of the high occupancy of the facility.

Now that we have relocated about 150 employees to our new Derry Administration building, the remains of the Mavis facility is not conducive to the requirements of a Utility Operations Centre and is also out dated. The Facilities Plan addresses how to better use the facility to meet business needs.

This project will:

1. Reduce the area of the Warehouse department by better utilizing the working area. A multi floor pre-fab office will bring the Supervisor and Warehouse staff together to increase efficiencies and Supervision. Also, per previous Indoor Air Quality tests performed, the air in this working environment is not ideal. Humidity, temperatures and TVOCs are often un-acceptable. This pre-fab office with its own HVAC unit will make it easier to control the environment conditions. This project will also see proper washroom facilities for the worker and delivery personnel. The reduced area will be converted to the garage area and will allow us to create a safer area as presently, the garage is extremely congested and extra care must be exercised everyday. At times, a few inches is the distances between trucks.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: ***Execute renovation project per the Facilities Plan.***

Complete this renovation project so that a healthier work environment for the warehouse staff and reduce the extreme congestion in the garage area.

OPTION 2: ***Do nothing***

Do nothing was considered, however, quickly discounted as this would mean that the warehouse area would continue to be inefficient with poor indoor air quality and safety concerns would continue with garage congestions.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 3 - First aid injury
	<u>Support:</u> Comments... An area that does not meet ASHRAE guidelines with building comfort could cause discomfort to employees having to seek medical attention.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>
	System Expansion This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 - 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 3 to 6 months Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? The warehouse area would continue to be inefficient with poor indoor air quality and safety concerns would continue with garage congestions.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$300,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu	Anticipated Derecognition
Please specify		-	

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)
 See Attach Mavis Facilities Plan

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$300,000 <i>Initial Assessment:</i> \$300,000 <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <u> </u> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - First aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Computer Room Halon Conversion
PROGRAM NAME:	Grounds and Building
BUSINESS UNIT:	C0591 - GROUNDS & BUILDINGS
SPONSOR:	JP Michaud
INITIATOR:	JP Michaud
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Facilities, IT
DATE SUBMITTED:	June-07-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0591-11

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Enersource currently utilizes a Halon fire suppression in its computer room at its Mavis location. Halon is an excellent fire suppression chemical but has adverse effects on the ozone, and as such the system no longer meets code and requires replacement. Enersource plans to replace its existing fire suppression equipment with a system that does not use the Halon to ensure the organization is in line with all environmental regulations.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Halon fire suppression systems present a potential negative impact to the environment, and may not meet code, as such Enersource wishes to be proactive and replace the existing fire suppression system in the Mavis IT room with a system that will not have any environmental impacts and more in line with existing building code requirements.

Environment Canada banned the recharging of Halon Systems in Canada in 2009. Should a discharge occur, Enersource would not be able to recharge the Halon System, hence, our Data Centre would be at risk should we have a discharge.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

Staus Quo. Enersource can do nothing and be at risk of being out of compliance and potentially damage the environment should the system be discharged. Also, should there be an accidental discharge, Enersource would not be able to recharge the system, leaving our data centre at risk.

Explanation

OPTION 2:

Change the system to a more compliant system and environmentally friendly alternative.

Explanation

OPTION 3:

Explanation

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Enersource will make the investment to change the fire suppression system to ensure the organization stays in compliance with all environmental and building codes, and acts as a good member of the community by utilizing environmental friendly solutions to its business needs.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> • Maintain customer reliability with reduced outage duration and frequency • Replace end of life assets • Improve reliability, power quality and safe operation of the underground equipment
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> • Improves reliability and power quality for customers
	Reputational Risk Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk <u>Support:</u> Improves reliability and power quality for customers

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u> Eliminate safety hazards to the public where there are holes in the live equipment that a person may get access or from utility personnel operating unsafe equipment.
	Environmental Impact/risk This projects mitigates exposure that could cause: 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <u>Support:</u> Improve reliability, power quality and safe operation of the underground equipment
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u> PMH units allow more transformers to be connected to them.
	System Renewal This project is for replacement of distribution assets where: <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-15
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q2 2016
	What is the impact of deferring or not meeting the specified deadline date? The system may become out of code.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 	
	One-Time Costs <u>Support:</u> Comments...	This project will incur/create one-time costs of: \$285,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 	Anticipated Derecognition What type of assets are being replaced?

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$285,000 <i>Initial Assessment:</i> \$285,000 <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> - <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu <i>Final Assessment:</i> - <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	2016-2021 Desktops-Laptops Platform upgrade
PROGRAM NAME:	Infrastructure-Engineering Road Map
BUSINESS UNIT:	C0585 - INFORMATION TECHNOLOGY
SPONSOR:	Ramez Hakeem
INITIATOR:	Zack Afiane
DEPARTMENTS INVOLVED:	ISTS
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0585-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This project is a 6 year roadmap plan that addresses all the in-place IT infrastructure at Enersource and the need to keep it current to a level that is supported by the manufacturers that provide them. Enersource leverages 3rd party and manufacturer information to determine the optimal cycle (support, cost, performance, etc.) for upgrade and replacement This hardware refresh program is needed in order to maintain the reliability of IT assets. Dependable IT assets enable Enersource employees to complete their daily tasks effectively by reducing downtime and lost productivity. Where applicable, Enersource utilizes the approach of replacing all of its assets in a category at the same time rather than spreading the replacement cycle over multiple years. For example, all desktops are replaced at the same time; this practice is followed to ensure standardization of the asset across the organization. A standardized desktop infrastructure forms the foundation for desktop optimization. It is by standardizing desktop hardware and software that organizations can ultimately advance toward a more flexible, agile, and optimized infrastructure. Ad-hoc desktop purchases often driven by price, or by departmental and end-user preferences can ultimately prove much more costly to the organization when a comprehensive view of desktop lifecycle costs is taken into account. While the cost of equipment and software remains relatively constant whether a company uses a staggered replacement cycle or a single enterprise wide deployment, the maintenance costs associated with a staggered cycle can be 30% to 45% greater than a single-cycle approach. This is attributed to the fact of maintaining and supporting multiple inconsistent computing platforms, operating systems, applications and one-off configurations. For other hardware types i.e., servers, data storage, etc. the replacement cycle is determined based on the asset type, vendor support coverage, and acceptable performance of the hardware. http://www.informationweek.com/the-pc-replacement-decision/d/d-id/1033629? http://www.intel.com/content/dam/www/public/us/en/documents/best-practices/pc-lifecycle-management.pdf	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The IT hardware platform at Enersource is diverse and includes not only the IT systems (servers and storage) but also laptops and PC's, Data Switches, multimedia devices, printers and copiers, phone system, Wireless Access Points, projectors, as well as mobile handhelds and TV's. Each hardware platform has its life cycle that is tied to the support from the vendor. As such, any hardware that runs out of support will have to be replaced.

The Desktop and Laptop platforms have a life cycle of approximately 4 years (Desktops) and 3 years (laptops), after which hardware has to be upgraded. Engineering Desktops and Laptops are refreshed more frequently than the rest because they run critical applications (such as IOM, AM/FM) which require higher computing power.

This project and cost will cover the upgrade of the 2 hardware platforms (Desktops and Laptops) for around 450 desktops and 200 Laptops during the 6 year period.

During the lifetime of the system (Desktop or laptop), the vendor assurance covers most of this period. After the vendor coverage, the repair costs exceed the value of the computer. The approach is to avoid spending more time and money repairing old computers than using them so a new computer will provide significant ROI. Also, faster and newer computers lead to greater employee productivity.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

Follow vendors' own road maps for their products as well as consult main websites for renewal approaches (Gartner, etc...)

Explanation This option will provide the hardware stability for Enersource users. Users will always work with PCs and laptops that are performing well with less downtime. Another positive point is that the industry is always improving so newer HDW is always more powerful from processing speed, memory, storage space, etc...

OPTION 2:

Don't upgrade and continue using existing hardware

Explanation Working with older HDW is always a challenge. After a certain period of time (around 4 years for PC's and 3 for laptops), hardware issues will be more common and this will affect users' productivity. IT will have to spend more time troubleshooting those issues, rebuild, buying spare parts such as HDD, etc... which will impact the operating cost

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

The approach in the IT roadmap is to set the renewal period for each hardware and software based on the support with the vendor as well as the life cycle of the product. Hardware and applications will be upgraded to a newer version, supported by vendor and offering features that the business requires. It is not possible to always go with the latest product on the market as we may have some incompatibilities with other components in the infrastructure.

The general approach for implementation is using the internal IT resources when possible. In some cases, outsourcing the work and the planning of a project to the vendor themselves is wiser.

Keeping the hardware and software in production during the supported life cycle period helps the business avoid big unbudgeted and unplanned expenses as well as avoid risks of production downtime due to an unsupported platform

The option of not upgrading introduces multiple challenges and poses high risk to business operation because:

- Availability of replacement parts: most hardware vendors commit to three or four years of parts availability;
- Security risks: security fixes and vulnerability patches are often not available for older systems; and
- Cost Avoidance: having out-of-support asset could prove more costly since Enersource may have to procure specialized technical resources to maintain the outdated asset

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required as per IT infrastructure road map
	If project is mandatory, can this project be deferred? Desired – Deferral of project can be accommodated and may not impact or displace projects in future years.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Select from drop-down menu <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? Select from drop-down menu <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? Select from drop-down menu <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: Select from drop-down menu
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: Select from drop-down menu
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: Select from drop-down menu
<u>Support:</u>		
System Expansion	This project increases system capacity: Select from drop-down menu	
<u>Support:</u>		
System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu	
<u>Support:</u>		

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes	
	Anticipated start date: January-01-16	
	Urgency of implementation? 6 month to 1 year	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Minimal impact	
	What level of uncertainty is associated to implementation (unknowns or variables)? Low	
	Do other projects rely on this project being completed? No	

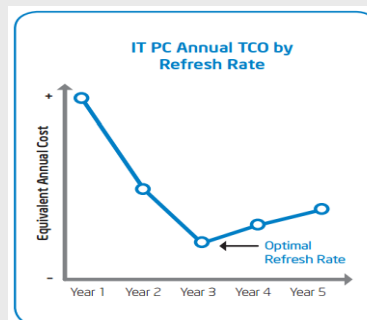
FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount
	One-Time Costs <u>Support:</u> See details below.	This project will incur/create one-time costs of: \$951,000
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: [Redacted]
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 3 years What type of assets are being replaced? Desktops & Laptops Anticipated Derecognition [Redacted]

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Hardware Category	Lifecycle
Desktop (single-task users and task-oriented users)	4 years
Desktop (specialized users), laptops, tablets, GPS units, etc.	3 years
Printers, plotters, etc.	5 - 6 years (dependent on end of vendor support)
Monitors, projectors	6 years
Servers, data storage, switches, voice and telecommunications, etc.	4 - 8 years (dependent on end of vendor support)



Infrastructure

Email Messaging System Upgrade	\$65,000
Mobile Phone platform renewal/upgrade	\$52,000
Printer Platform upgrade	\$44,000
All-In-Ones Toshiba Printers/Copiers/scanners upgrade	\$145,000
BladeCentre Chassis Mavis Datacentre upgrade	\$45,000
Microsoft Licensing True up	\$50,000
Virtual Hold for Customer Service	\$140,000
IT Assets Inventory tool	\$80,000
Additional hardware	\$50,000
Desktops & laptops	\$280,000
Totals	\$951,000

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$951,000</u> <i>Variance:</i> <u>(\$951,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required as per IT infrastructure road map</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date

Infrastructure/Engineering 6 years 2016-2021 RoadMap: Desktops & Laptops Refresh plan

	2016	2017	2018	2019	2020	2021	TOTAL
<u>Infrastructure</u>							
Desktops & Laptops		\$115,000	\$405,000		\$120,000	\$410,000	C0585
<u>Engineering & Asset Systems</u>							
Desktops & Laptops	\$280,000	\$230,000	\$230,000	\$200,000	\$250,000	\$200,000	C0581
Totals	\$280,000	\$345,000	\$635,000	\$200,000	\$370,000	\$610,000	\$2,440,000



PROJECT BUSINESS CASE	
PROJECT NAME:	System Upgrades - JDE, Flex Time Tracking, and Microsoft Dynamics
PROGRAM NAME:	System Upgrades - JDE, Flex Time Tracking, and Microsoft Dynamics
BUSINESS UNIT:	C0588 - JDE ERP SYSTEM
SPONSOR:	Ramez Hakeem
INITIATOR:	Ken Yeh
DEPARTMENTS INVOLVED:	IT
DATE SUBMITTED:	May-15-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0588-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Upgrade JDE-Enterprise applications in order to maintain support provided by the software provider. This ensures that the applications are upgraded on a regular basis, supported by the vendor and maintain integration with other applications. This project is for all scheduled upgrades for all JDE-Enterprise applications, including JDE, DSI, business intelligence, middleware and utilities needed to support the integrated systems. Some of the major application are: • J.D. Edwards (JDE) – the corporate Enterprise Resourcing Planning (ERP) system, include the following: - o Finance – General Ledger, Accounts Payable, Accounts Receivable, Fixed Assets - o Operations and Services– Work Management (service orders/project costing), Timesheets, Case/Call Management - o Supply Chain – Inventory/Warehouse Management, Procurement - o People Team – Employee Management • Business Intelligence applications such as IBM Cognos and Microsoft B.I. • Internet and Intranet Web platforms/ technologies such as SharePoint and .NET • Microsoft Dyanamics Customer Relationship Management (CRM) system used by the CDM and Customer Care groups • Flex Time Tracking used by union employees for work time data entry	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

All critical IT systems must be upgraded on a regular basis in order to ensure that they are supported by their respective vendor and third party support software applications and hardware infrastructure.

Due to uncertainties and lack of visibility around some of the application vendors' direction and long term roadmap, the timing of some of the upgrades may be adjusted as more information is attained. In general, the upgrades scheduled for years further out are more subject to change due to the following reasons:

1. Most vendors provide firm 1 to 2 years roadmaps
2. Published future main and 3rd party supporting application's roadmaps, versions and functions/features are also subject to change by their respective vendors

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Upgrade of JDE-Enterprise applications.

This will ensure that the applications will:

1. Be supported by their respective vendors.
2. Be compatible with new versions of other 3rd party supporting software and hardware such as Internet Explorer and physical servers.
3. Have vendor supported upgrade paths.
4. The above will increase application availability and performance relative to if no upgrades are done. This will also lead to fewer business interruptions.

OPTION 2: Delay/Do not upgrade JDE-Enterprise applications.

This will entail that:

1. The respective application vendors will not support/assist if and when problems arise.
2. Compatibility with newer versions of other supporting applications will is not ensured. Examples are that the application may not work with new versions of Microsoft Excel, Internet Explorer or Windows.
3. The above will also lead to the inability to adopt and enhance the applications to an evolving environment
4. Vendor may not support a direct upgrade path from unsupported versions to their most recent releases. This will mean more complex and expensive upgrades in the future.
5. The hardware infrastructure (e.g. servers) will also become obsolete so replacement parts to fix any hardware issues may be difficult to find and the application may not work on new hardware.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Upgrade of JDE-Enterprise applications to achieve benefits listed above.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required as per IT infrastructure road map
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR
	<u>Support:</u>	
	Customer Satisfaction	Does this project add Customer Value? 0 - No impact on Customer Service
	<u>Support:</u>	
	Reputational Risk	Does this project reduce or eliminate a reputational risk? 0 - No brand impact
	<u>Support:</u>	

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: < 3 months 2016/2017
	What is the impact of deferring or not meeting the specified deadline date? Support may cost more, or not be available, or partially available, depending on the application or system
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Varies

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: Select from drop-down menu
	Support:	
	One-Time Costs	This project will incur/create one-time costs of: \$935,000
	Support: See schedule below for details.	
	Ongoing Costs	This project will incur/create ongoing costs of:
	Support:	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Upgrade of applications
		Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

JDE-Enterprise Roadmap Activities	
JDE Major Version Upgrade	\$ 600,000
Flex Time Tracking Upgrade/Migration	\$ 100,000
Microsoft Dynamics CRM Upgrade	\$ 25,000
Additional software licenses/enhancements and hardware	\$ 50,000
SUBTOTAL - Roadmap	\$ 775,000
IBM Cognos - JDE Intergration - Operating vs Capital Tracking by Employee	\$ 80,000
Customer Service Live Chat	\$ 30,000
AP - Link - EFT	\$ 50,000
SUBTOTAL - Enhancements	\$ 160,000
TOTAL	\$ 935,000

JDE Major Version Upgrade (\$600K) will not be in service until 2017; all others will be in service in 2016.

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Select from drop-down menu</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$935,000</u> <i>Variance:</i> <u>(\$935,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required as per IT infrastructure road map</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Microsoft Business Intelligence
PROGRAM NAME:	Microsoft Business Intelligence
BUSINESS UNIT:	C0588 - JDE ERP SYSTEM
SPONSOR:	James Macumber
INITIATOR:	James Macumber
DEPARTMENTS INVOLVED:	Asset Strategy, Asset Operations, Finance, IT
DATE SUBMITTED:	May-15-14
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0588-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> At Enersource, there are a number of separate systems for managing customers, tracking assets, financials, tracking energy consumption, capturing equipment locations and faults among other classes of assets. The data in these separate systems can be combined; however this is currently accomplished on an ad-hoc basis, as information requests are processed manually. The manual ad-hoc process limits the amount of data insights due to the lack of agility in pulling data together, which makes it difficult to make informed decisions and act proactively with the changing business climate. This project is to address the above by implementing a Business Intelligence (B.I.) solution that will provide accurate, complete, and timely reporting across all areas and systems involved in asset management. This will lead to the enhanced ability to identify, monitor and manage the asset base and the supporting processes and thereby optimize the operational effectiveness of the asset base to provide the greatest value to our customers.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Enersource uses a number of individual systems for managing customers (including billing and energy consumption) in Oracle's Customer Care and Billing (CC&B), tracking assets (including location, age, faults etc.) in Intergraph's AM/FM and financials (including asset cost and work orders) in Oracle's J.D. Edwards. While it is possible to connect data from multiple systems, these connections are currently made on an ad-hoc basis, in order to satisfy specific report needs as they arise.

The following business problems help illuminate the motivation for this project:

- Disparate data sources make it difficult to get access and to combine all the required information
- Data is gathered and processed by the team and presented to business decision makers, which can cause delays in managing the business
- Data augmentation and reporting environments are not flexible to easily accommodate business changes, not very accessible and information is not easily shareable
- Significant amount of time is spent on manual data augmentation and report generation
- Time consuming manual validation of reports vs. reconciled source data

Overall this limits the agility of data insights, making it more difficult to make informed and optimal decisions.

The key opportunity is the combining of data from various systems in order to answer business questions by examining key performance indicators (KPIs) that either cannot be combined today or result from an overly manual and time consuming process. This will result in the ability to provide accurate, complete, and timely reporting across all areas and systems involved in asset management.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Implement Microsoft's Business Intelligence platform as the basis to consolidate and provide insight into the data from the multiple systems at Enersource.**

Microsoft Business Intelligence is an established platform that also leverages Enersource's existing technology investments such as SharePoint and Microsoft SQL servers.

OPTION 2: **Continue with the status quo**

This option will not address the business problems/challenges listed above.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

The solution selected is to implement Microsoft's Business Intelligence platform as the basis to consolidate and provide insight into the data from the multiple systems at Enersource. This is an established platform from a strong industry leader that can be counted on to provide technology innovations and support to Enersource as business needs evolves. In addition, this solution also leverages Enersource's existing technology and personnel investments such as SharePoint and Microsoft SQL servers.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 3 - First aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 5 - Prevent 50,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years Q2 2016
	What is the impact of deferring or not meeting the specified deadline date? Delay in the getting the benefits stated above.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Please specify other projects

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 8 - > \$80,000	
	<u>Support:</u>		
	One-Time Costs	This project will incur/create one-time costs of: \$200,000	
	<u>Support:</u> Project commenced in 2015 and will continue into 2016. Budgets are \$300K in 2015 and \$200K in 2016.		
	Ongoing Costs	This project will incur/create ongoing costs of: -	
	<u>Support:</u>		
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu	Anticipated Derecognition
		What type of assets are being replaced? New IT Asset	

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 8 - > \$80,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$200,000 <i>Variance:</i> <u>(\$200,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - First aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Prevent 50,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Long Term Asset Planning Solution
PROGRAM NAME:	Long Term Asset Planning Solution
BUSINESS UNIT:	C0588 - JDE ERP SYSTEM
SPONSOR:	James Macumber
INITIATOR:	James Macumber
DEPARTMENTS INVOLVED:	Asset Strategy, Asset Operations, Finance, IT
DATE SUBMITTED:	May-15-14
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0588-3

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This project is to implement a prioritization solution that will gather and analyze large volumes of data from multiple software systems that are necessary for consistent, optimal and timely capital decision making. This will allow Enersource to make the necessary investments in the capital programs/projects that will bring the greatest value to our customers.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The basic premise of infrastructure asset management is to intervene at strategic points in an asset's normal life cycle to extend the expected service life, and thereby maintain its performance. Typically, a long-life-cycle asset requires multiple intervention points including a combination of repair and maintenance activities and even overall rehabilitation. Costs decrease with planned maintenance rather than unplanned maintenance. Yet, excessive planned maintenance increases costs. Thus, a balance between the two must be recognized. Each improvement raises an asset's condition curve and a complete replacement returns the condition curve to new level or upgraded level. Therefore, strategically timing these interventions will aid in extending an asset's life cycle. A simple working definition of asset management would be: first, assess what you have; then, assess what condition it is in; and lastly, assess the financial burden to maintain it at a targeted condition.

In order to determine when to replace an asset based on Enersource's business values, a prioritization solution is required to gather and analyze large volumes of data from multiple software systems for consistent and optimal decision making. The asset's physical attributes, condition, location, history and financial information are examples of data that must be attained from systems such as Intergraph's AM/FM and Oracle J.D. Edwards. Then the prioritization solution will use the data to answer a pre-configured set of risk and benefit value based questions in order to assist in determining the optimal level of investments in the programs/projects that will bring the greatest value to our customers. The immense amount of asset and other data that must be gathered and analyzed requires a technology solution for the investment decision making process to be consistent and timely.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Implement Copperleaf C55 as the Long Term Asset Planning Solution.**

See Solution Section below for explanation

OPTION 2: **Riva Modelling**

See Solution Section below for explanation

OPTION 3: **Continue with the status quo**

This option will not help with improving Enersource's long term asset investment prioritization and decision making process. This will result in increased relative risk of not delivering optimal operational and financial effectiveness and values to our customers.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Two software solutions were reviewed, Copperleaf C55 and Riva Modeling. Based on the evaluation of each system (see appendix) and the estimated costs, it would appear there is not a significant difference in either solution. However, due to fact that Riva does not have any electrical utility clients in Ontario and Copperleaf C55 is being used at Powerstream, Hydro Ottawa and Hydro One, the ability to create a working group between similar users gives Copperleaf a slight advantage.

Therefore, the recommendation is to proceed with issuing an RFP for Copperleaf C55 software for the installation and the management of the project.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 8 - Adds value or service that customers have identified through survey or some other means <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? 8 - Positive impact on brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...	
	System Reliability	This project maintains or improves system reliability: 8 - Prevent 80,000 customer minutes of outage
	<u>Support:</u> Comments...	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u> Comments...	
	System Renewal	This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor"
	<u>Support:</u> Comments...	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation?
	1 year to 3 years
	And/or enter specific deadline/implementation date: 2017
	What is the impact of deferring or not meeting the specified deadline date? Delay in the getting the benefits stated above.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Please specify other projects

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 10 - > \$100,000
	<u>Support:</u> Cumulative productivity gains/savings of approx. \$1.9M by the end of 2021 and \$682K annually from 2021 onwards. Please see appendix.	
	One-Time Costs	This project will incur/create one-time costs of: \$1,500,000
	<u>Support:</u> \$750K in 2016 and an additional \$750K in 2017	
	Ongoing Costs	This project will incur/create ongoing costs of: >\$100,000
	<u>Support:</u> New software annual maintenance/support cost	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? New IT Asset
		Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

<u>Prioritization Software</u>		<u>Copperleaf</u>		<u>Riva</u>	
		<u>Score</u>	<u>Extended</u>	<u>Score</u>	<u>Extended</u>
Allows inputs from many sources including JDE, AM/FM, CC&B, 3rd parties - through standard conduits in the system	9	6	54	9	81
Provides ability to define different inputs and criteria on which plans will be developed	9	6	54	6	54
Be able to generate multiple "what if" scenario plans	9	6	54	6	54
Ability to update/change plans on a regular basis	9	6	54	6	54
Adequate "expertise" with vendor or the market to complete robust implementation of system	9	9	81	6	54
Availability of resources, post implementation, for further enhancements	9	6	54	3	27
Familiarity with Ontario Energy Board and can demonstrate systems capabilities in meeting their requirements	9	9	81	3	27
System is easy to understand and use - users require minimal training to be competent	6	6	36	9	54
System performance is robust - fast...able to generate new plans within min/hours (not days)	6	6	36	6	36
System can handle terabytes of data without serious performance degradation or corruption	6	9	54	9	54
System has assignable security that can vary depending on user's role	6	9	54	9	54
System works on Enersource standard platforms (operating systems, databases, hardware, etc.) - MS Windows Server, Oracle and MS SQL Server DB, Intel Servers, MS Windows client, MS Internet Explorer, etc.	6	6	36	6	36
Vendor has the ability to respond to software performance and technical issues on a timely basis.	6	6	36	6	36
Total Pre-Assessment			684		621
Potential		891	77%		70%
Estimated Cost		\$	1,500	\$	1,250
Total Score			78.4%		77.3%

FIGURE 1.1

PROJECT APPROVALS

 Business Unit Manager / Division Director

 Date

 Key Stakeholder (if appropriate)

 Date

 VP, Division

 Date

 VP, Asset Management Strategy

 Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 10 - > \$100,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,500,000 <i>Variance:</i> <u>(\$1,500,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> >\$100,000 <i>Variance:</i> <u>#VALUE!</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - Adds value or service that customers have identified through survey or <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - Positive impact on brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - Prevent 80,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - ACA health index "Very Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	MAJOR TOOLS
PROGRAM NAME:	2016 - 2021 MAJOR TOOLS
BUSINESS UNIT:	C0595 - MAJOR TOOLS
SPONSOR:	RAY BOU
INITIATOR:	RAY BOU
DEPARTMENTS INVOLVED:	ASSET OPERATIONS, ASSET MANAGEMENT, PURCHASING
DATE SUBMITTED:	September-29-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0595-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> In order to maintain and operate an electrical system as well as the operation of a fleet of approximately 200 vehicles, investment in quality tools is paramount. Tool expenditures of \$7,500 or more per item is classified as a "major tool" and requires additional internal approvals. In order to support the various capital and maintenance projects, Enersource projects spending \$200,000 a year on major tools for the years 2016-2021. This will ensure that the appropriate equipment is in good condition and available when needed in order to carry out other projects without any unnecessary delays.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

In order to maintain Enersource' distribution system and fleet, major tools are a necessity. Each truck is furnished with basic hand tools and equipment while specialized items are limited to specific trucks, (examples include: chainsaws on Forestry vehicles, cable cutters and crimpers on underground vehicles,). Tool expenditures of \$7,500 or more per item is classified as a “major tool” and requires additional internal approvals. This program covers the purchase of such items as:

- Mud tracks – to allow vehicles to traverse over wet ground and/or over buried pipelines;
- Temporary grounds - to create a safe work area for employees working within a de-energized area;
- Battery operated devices – provide better ergonomics tools for staff to reduce the risk of injury when repairing underground cables in splice pits and sleeving overhead conductors;
- Cable locating equipment – to locate buried electrical cables for internal work and to identify cables for other utilities so they can perform their construction work without causing cable damage; and
- Fault finding equipment – to aid in locating underground cable faults requiring repair.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

Purchase major tools in a proactive manner and on an immediate basis when the need arises. This would ensure that tools are always in good condition and a replacement is available immediately when needed. In cases where specific tools are not available or a new tool is required, immediate purchase would ensure no unnecessary delays to field work.

OPTION 2:

Defer purchase until major tool failure. With this option, the tools used in the field may not be in the best condition towards the end of their useful life. Furthermore, tool failure or a lack of a tool being readily available will cause delays to field work.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1 is the chosen solution as it ensures appropriate equipment in good condition is readily available and used on the jobs while ensuring smooth workflow.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 5 - Medical aid injury <u>Support:</u> If the major tools used on the job are not in good condition, an accident could occur causing serious injury.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u>
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? 3 to 6 months
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Appropriate tools may not be available for field work
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Most projects will require tools purchased under this program

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$200,000 \$200k per year for 2016-2021
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of:
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 10 years What type of assets are being replaced? Major tools Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$200,000 <i>Variance:</i> (\$200,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medical aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Customer Web Self-service
PROGRAM NAME:	Customer Web Self-service
BUSINESS UNIT:	Select from drop-down menu
SPONSOR:	Doug Morrison
INITIATOR:	Pam Spangenberg
DEPARTMENTS INVOLVED:	Customer service, Accounts Receivable (Collections), Billing
DATE SUBMITTED:	June-17-14
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0589-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Customer Service processed 46,418 moves in 2013, approximately 23% of our total customers and as we continue to grow, this number will increase. Web self-service for moves would reduce the time CSRs spend on processing customer moves, increasing customer satisfaction while decreasing call center costs.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☒	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The business is requesting a Web Portal where customers can view and update their account information on-line, 24-7. As stated in the UtilityPulse 2014 survey, utility customers now increasingly expect real-time access to information online. They need to be able to:

- View and pay bills via the Web
- Manage their account information and communication preferences
- Review their consumption and financial history
- Report outages online, see outage maps, and learn when the utility expects to restore power.
- Make requests online such as start, stop, or transfer service.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

This project is in the diagnostic stage and no application has been chosen for the solution yet. However, Oracle Web Self-service would be one of the solutions evaluated by the business because it integrates with CC&B.

OPTION 2:

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 8 - Adds value or service that customers have identified through survey or some other means <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? 3 to 5 years
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Plan for 2016 but have flexibility to implement later within mandated timelines.
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance	Cost Efficiencies	This project will save or avoid operational costs of:	
	<u>Support:</u>	0 - No significant amount	
	One-Time Costs	This project will incur/create one-time costs of:	
	<u>Support:</u>	\$400,000	
Financial viability is maintained; and savings from operational effectiveness are sustainable.	Ongoing Costs	This project will incur/create ongoing costs of:	
	<u>Support:</u>		
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced?	Anticipated Derecognition
		Select from drop-down menu	
		What type of assets are being replaced?	
		Please specify	-

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

The OEB's Renewed Regulatory Framework promotes customer focus, operational effectiveness, public policy responsiveness and financial performance. The EB-2010-0379 Report of the Board includes the following: "For distributors, a focus on delivering value will put a greater emphasis on understanding customer satisfaction and the cost/value trade-offs that customers are willing to make. This will help them to better plan their investments to focus on improvements valued by their customers." Offering customers a 24-7 web portal would help Enersource to do just that. The 2014 UtilityPulse Survey shows clearly that Enersource's customers are looking for improved on-line and self-service options. In the survey, our customers said that they would be very likely or somewhat likely to use the internet for:

- Arranging a move 41%
- Setting up a new account 36%
- Maintaining information about their account 58%

Customer Service processed 46,418 moves in 2013, approximately 23% of our total customers and as we continue to grow, this number will increase. Web self-service for moves would reduce the time CSRs spend on processing customer moves, increasing customer satisfaction while decreasing call center costs.

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$400,000 <i>Variance:</i> (\$400,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - Adds value or service that customers have identified through survey or <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Monthly Billing for Residential Customers
PROGRAM NAME:	
BUSINESS UNIT:	C0589 - METER TO CASH
SPONSOR:	John Bonadie
INITIATOR:	Carrie Worgan
DEPARTMENTS INVOLVED:	Billing, IT, RA,
DATE SUBMITTED:	May-15-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0589-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> OEB Bill Accuracy regulations requires all LDC's to bill residential customers on a monthly basis by January 1, 2017. Enersource has approximately 178,00 residential customer being billed bi-monthly	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

Make required system changes to bill residential customer on a bi-monthly basis. Align implementation with CC&B upgrade, in order to reduce the involvement of the CIS vendor and reduce the number of testing cycles. Use expert internal resources for testing, rates configuration and analysis reducing costs

Explanation: Internal resources have expert knowledge of both the Customer Information System and the current and required business processes. This is why it is beneficial to use internal resources where possible.

OPTION 2:

Implement monthly billing as a separate project from the Customer Information System upgrade. Use external resources for requirements, design, testing and implementation.

Explanation: This option reduces the implementation risk of both the monthly billing project and the CC&B implementation and increases the costs of the two projects combined. The reduction in risk is not sufficient to justify the added costs.

OPTION 3:

Explanation

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1: Combine the Monthly Billing and Customer Information System upgrade projects into one larger implementation and use internal expert resources wherever possible.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Comments...

Customer Focus	Service Quality Does the project improve a Customer Service ESQR metric? 10 - Improvement from non-compliance to compliance <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> • Monthly billing results in smaller invoices, making payments and budgeting easier to manage, especially for low income and senior's • Monthly billing promotes improved customer education & better understanding of their bill and consumption patterns, as the bill is closer to 'real time'; • Monthly billing promotes better customer service by enabling staff and customers to identify problematic consumption earlier
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: June-01-16
	Urgency of implementation? 3 to 6 months
	And/or enter specific deadline/implementation date: Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? Non - compliance
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? Please specify other projects

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 10 - > \$100,000
	<u>Support:</u> Net savings overall per year: \$138,000. See attached for breakdown.	
	One-Time Costs	This project will incur/create one-time costs of: \$725,000
	<u>Support:</u> See attached for breakdown.	
	Ongoing Costs	This project will incur/create ongoing costs of: \$1,295,000
	<u>Support:</u> See attached for breakdown.	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify
		Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

<u>Customer Data (as of Aug 31, 2014)</u>				
Total Residential Customers	178,930			
epost	12,525			
ebilling accounts	17,893			
Non- E bill/post Accounts	148,512			
Average Bill/Payment (bi mthly)	\$ 216.73			
Average Bill/Payment (mthly)	\$ 108.36			
Costs				
	Unit cost	Current Annual Costs Bi-Monthly	Annual Cost for Monthly Billing	Incremental Costs
Postage	0.77			
Kubra cost *	0.20			
(bill printing, mailing,stock)				
Total Invoice Cost	0.97			
epost Cost	0.39			
e-bill cost	0.19			
Cost to send Regular Invoices		864,339	1,728,679	
Cost to send epost Invoices		29,309	58,617	
Cost to send ebill Invoices		20,398	40,796	
Total Annual Billing Cost		914,046	1,828,092	914,046
<u>Payment Processing</u>				
average auto pay	0.047			
average non autopay	0.050			
Nbr of Accounts				
NBB (@auto pay)	23,619	13,321	13,321	
Non NBB Autopay	28,255	7,968	15,936	
Total Auto Pay	51,874	21,289	29,257	7,968
NON-Auto Pay (@avg cost)	127,056	38,117	76,234	38,117
IT on-going costs (20% of hardware and licensing so 20% of \$600k)			120,000	120,000
Customer Call increase	5.000	805,185	830,185	25,000
AMI / Billing/ Collections additional resources requirement			100,000	100,000
Collections Related Expenses				
Decrease in LPC revenue due to increase in payments revenue			90,000	90,000
Total Incremental On-Going Costs		1,778,637	3,073,768	1,295,131
				-
* Current costs based on B&W printing, new Ministry of Finance requirements for colour printing will add additional costs				
Total Incremental Annual On-going Costs				\$ 1,295,131

PROJECT APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 10 - > \$100,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$725,000 <i>Variance:</i> <u>(\$725,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$1,295,000</u> <i>Variance:</i> <u>(\$1,295,000)</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Project required to become or remain compliant with applicable legislation and/or regulation <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Improvement from non-compliance to compliance <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



PROJECT BUSINESS CASE	
PROJECT NAME:	PrimeRead TOU Billing Replacement
PROGRAM NAME:	
BUSINESS UNIT:	C0589 - METER TO CASH
SPONSOR:	John Bonadie
INITIATOR:	Doug Reid
DEPARTMENTS INVOLVED:	AMI, Billing, Revenue Assurance, Settlements
DATE SUBMITTED:	May-26-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> The purpose of this project is replace PrimeRead or at least the compenents currently used to bill Commercial and Industrial customers. There is a regulatory requirement to bill general service greater than 50kW using interval data and PrimeRead does not have this capability.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

PrimeRead has significant weaknesses which make it unsuitable as a mission critical system - it is poorly written and support from PrimeStone has been inconsistent. It lacks functions to enable interval billing of energy.
It may be necessary to keep PrimeRead as a meter reading engine without using any of its functions related to billing meter data.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Replace all PrimeRead functions except collecting meter reads with LPSS or a Meter Data Warehouse*

PrimeRead is currently used to collect IMS meter reads as well as to process C&I meter reads prior to being sent to CC&B for billing. It is proposed that PrimeRead only be maintained as a meter data collector, and meter read processing occurring in either LPSS or a new Meter Data Warehouse scheduled for implementation in 2017.

OPTION 2: *Replace all PrimeRead functions including meter reads*

Explanation

OPTION 3:

Explanation

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required as per IT infrastructure road map
	If project is mandatory, can this project be deferred? Required - Deferral of project not recommended and will impact the schedule for multi-year programs.
	<u>Support:</u> Replacement of PrimeRead is required to support regulatory requirements for greater than 50kW billing and to adhere to the IT infrastructure road map. There are also synergies between this project and projects such as the meter data warehouse, and MDMR billing.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR
	<u>Support:</u>	
	Customer Satisfaction	Does this project add Customer Value? 0 - No impact on Customer Service
	<u>Support:</u>	
	Reputational Risk	Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand
	<u>Support:</u>	

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor"
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-04-16
	Urgency of implementation? 1 year to 3 years
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Delaying this project will impact other projects such as meter data warehouse, gs>50 interval billing, and MDMR billing project.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? The project could have a dependancy on the meter data warehouse project if it is decided that LPSS can't support the C&I billing requirements.

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies Support: Comments...	This project will save or avoid operational costs of: Select from drop-down menu
	One-Time Costs Support: One time costs are a combination of external costs of \$170k and internal costs of \$30k.	This project will incur/create one-time costs of: \$200,000
	Ongoing Costs Support: There are not incremental ongoing costs anticipated.	This project will incur/create ongoing costs of: -
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Select from drop-down menu</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$200,000</u> <i>Variance:</i> <u>(\$200,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required as per IT infrastructure road map</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - ACA health index "Very Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Upgrade CC&B
PROGRAM NAME:	Upgrade CC&B
BUSINESS UNIT:	C0589 - METER TO CASH
SPONSOR:	Ramez Hakeem
INITIATOR:	Johanna Raycraft
DEPARTMENTS INVOLVED:	Meter to Cash, Billing, Metering, Collections, Customer Service, Settlements, IT infrastructure, Revenue Assurance, Rates, Finance, AM/FM
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Our Customer Information System and Billing system (CIS), version 2.2 of CC&B, was implemented in 2009. Since that time the vendor has released upgraded versions of the product. During 2015, the vendor issued version 2.5 of CC&B. Enersource plans to upgrade to the latest version of CC&B in 2016.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Upgrade CC&B to version 2.5

Why Upgrade?

Maintenance of support

Enersource pays support fees to the vendor which pay for a variety of services. As time passes from the date the product was initially released, the level of support offered by the vendor through basic support fees is reduced. During 2016, the vendor will no longer supply certain services on version 2.2 of CC&B within the basic support fees, although they are still available. The excluded services include security alerts, new critical patch updates and certification with new versions of third party products. Staying current helps control costs by ensuring that critical support services are included in the basic support fees.

CC&B is implemented in a complex environment with many different technologies at different layers, and has many interfaces to other products, all of which have their own upgrade schedules. For this reason it is important that each component of the integrated solution be kept current so that all components continue to work together and be supported by their vendors. This practice reduces the risk that a problem could be encountered that demands an immediate fix which is only available on a current version of a product, with a cascading impact on other interrelated solutions.

Scope of the project

The upgrade will primarily be a technical upgrade, except for the adoption of critical upgraded features. This will reduce the scope of the project. Non-critical new features can be adopted at a later date as needed.

In particular, Enersource intends to implement the new rates module available in version 2.5 of CC&B. An updated rates module is expected to improve Enersource's ability to implement new rate structures and billing calculations, reducing the effort and risk of these projects.

The scope of the project includes the implementation of the upgraded code, the upgrade of all the customized modules, upgrade of all required reports, review and testing of all integration with partners involved in Meter to Cash. Business design will be required for all upgraded features as well as the design and delivery of training to the business users. Finally, all operating procedures will have to be reviewed in order to determine the impact of the upgrade and performance testing will be performed. Cutover and Go Live activities will be planned and coordinated with all business partners as required.

OPTION 2: Upgrade CC&B to version 2.4

By choosing the latest version of CC&B, Enersource will not have to upgrade CC&B again until 2023. By choosing to upgrade to version 2.5, Enersource will be one of the earlier adopters of this release, which is an increased risk compared to adopting version 2.4. However, if Enersource selected version 2.4, Enersource would have to upgrade CC&B in 2020. The opportunity to delay an upgrade is felt to be a greater benefit than the risk of being an early adopter.

The scope and cost of the project is similar whether version 2.4 or 2.5 is selected.

OPTION 3: Keep CC&B on the current version

Enersource's IT strategy includes the regular planned upgrade of all critical business systems. This minimized the risk of issues among the integrated solutions involved in the Meter to Cash business process and helps control annual support fees. CC&B was implemented with the idea that it would be a robust long term solution for Enersource. Upgrading regularly helps ensure that CC&B continues to deliver a high quality of service to the customers and to the business users.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

The solution chosen is to upgrade CC&B at the end of the current support period to the latest available version of CC&B. This ensures that the application remains current, continues to deliver high quality service and delays the next upgrade for as long as possible.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required as per IT infrastructure road map
	If project is mandatory, can this project be deferred? Required – Deferral of project not recommended. Project required to proceed and will displace projects in future years.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR
	<u>Support:</u>	
	Customer Satisfaction	Does this project add Customer Value? 0 - No impact on Customer Service
	<u>Support:</u>	
	Reputational Risk	Does this project reduce or eliminate a reputational risk? 0 - No brand impact
	<u>Support:</u>	

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Jan 1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year October-31-16
	What is the impact of deferring or not meeting the specified deadline date? Impact on other projects, impact on support quality of billing application
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? Delay in this project will impact implementation of all other Meter to Cash projects

FINANCIAL SUMMARY

Financial Performance

Financial viability is maintained; and savings from operational effectiveness are sustainable.

Cost Efficiencies

This project will save or avoid operational costs of:

0 - No significant amount

Support:

One-Time Costs

This project will incur/create one-time costs of:

\$950,000

Support:

Upgrade Assessment and Planning	Upgrade Interfaces	Upgrade Customization	Upgrade Reports	Integration testing	Total
\$ 70,000.00	\$ 155,000.00	\$ 250,000.00	\$ 125,000.00	\$ 350,000.00	\$ 950,000.00

Ongoing Costs

This project will incur/create ongoing costs of:

-

Support:

Impact on Distribution Rates / Revenue Requirement

What is the age of the assets being replaced?

Select from drop-down menu

What type of assets are being replaced?

Please specify

Anticipated Derecognition

-

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$950,000</u> <i>Variance:</i> <u>(\$950,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required as per IT infrastructure road map</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Collections Enhancements to CC&B
PROGRAM NAME:	Collections Enhancements to CC&B
BUSINESS UNIT:	C0589 - METER TO CASH
SPONSOR:	Martin Sultana
INITIATOR:	Kasia Bielska
DEPARTMENTS INVOLVED:	C0589 - METER TO CASH
DATE SUBMITTED:	May-26-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0589-5

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
X	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

This is a program of 9 projects.

Year	Project Name	Short Description	Cost
2016	Deposit review process	Deposit review process	50,000
2016	Cash Processing and scanning equipment	Cash Processing and scanning equipment	75,000
2016	IMS collections	Modify collections and severance processes for smaller residential accounts.	40,000
2016	Automate notice: Residential customers	Automate notice : residential customers	30,000
2017	Deposit Review Process	Automate On-line Deposit Review	30,000
2018	SYNC for NBB A/C's - Carryover from 2014	fix issues with calculating the NBB renewal amounts	70,000
2018	Collection Agency Interface	Interface for second assignments	50,000
2018	Link CC&B with the alerts and disconnect list	publish a real time disconnect list for Enersource employees	30,000
2019	Severance Process	Severance Process Enhancements	100,000

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Implement changes in CC&B through customization and configuration.**

OPTION 2: **Increase manpower in order to meet OEB requirements and process payments on a timely basis.**

OPTION 3: **Maintain the status quo, which would mean not meeting OEB requirements and processing payments on a**

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Implement changes in CC&B through customization and configuration.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: Select from drop-down menu
	Support: Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	Support: Comments...	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
Support: Comments...		
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	Support: Comments...	
	System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu
	Support: Comments...	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes	
	Anticipated start date: January 1 2016	
	Urgency of implementation? 6 month to 1 year	And/or enter specific deadline/implementation date: Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? Regulatory compliance, customer service impacted, impact on call volumes and ESQR's, impact on cash flow, and bad debt expense.	
	What level of uncertainty is associated to implementation (unknowns or variables)? Low	
	Do other projects rely on this project being completed? Yes. Need the cash processing solution for monthly billing.	

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 3 - > \$30,000	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$195,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: \$5,500	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? <i>Select from drop-down menu</i> What type of assets are being replaced? <i>Please specify</i>	<i>Anticipated Derecognition</i> -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$195,000 <i>Variance:</i> <u>(\$195,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$5,500 <i>Variance:</i> <u>(\$5,500)</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Project required to become or remain compliant with applicable legislation and/or regulation <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Improvement of multiple ESQRs Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Improves customer experience (a large user or 1000 RES customers) Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Helps preserve brand Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: Select from drop-down menu Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - None Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on customer minutes of outage Support: Comments...
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No Impact on system capacity Support: Comments...
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: Select from drop-down menu Support: Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT SHEET	
PROJECT NAME:	Deposit review process
PROGRAM NAME:	Collections Enhancements to CC&B
BUSINESS UNIT:	C0589 - METER TO CASH
SPONSOR:	Martin Sultana
INITIATOR:	Kasia Bielska
BUSINESS CASE #:	2016-C0589-5A

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> To automate the deposit review process. The algorithm for identifying good customers is not accurate in all cases and this requires manual intervention.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Meet OEB requirements, and will proactively communicate with customers with regard to security deposits, more timely increase/decrease to deposits based on customer account activities. Reduced risk of bad debt, quantifiable. Currently only look at the highest risk customers, and will be able to extend the review to all customers

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	IMS collections
PROGRAM NAME:	Collections Enhancements to CC&B
BUSINESS UNIT:	C0589 - METER TO CASH
SPONSOR:	Martin Sultana
INITIATOR:	Kasia Bielska
BUSINESS CASE #:	2016-C0589-5B

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles,</i> To create a specific collections process which recognizes that the IMS accounts have lower average receivables per account than other residential accounts requiring different parameters. Specific separate severance field activities are needed to identify different customer types.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Enersource will be more proactive and start communication with IMS customers more promptly, preventing the customer from incurring large amount of debt over a long period of time. Reduced risk of bad debt on the smaller A/R balances. Current process is focussed on a threshold amount, which prevents these accounts from getting the attention that they need. Provides an opportunity if approved to increase charges for collections activities.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Cash Processing and scanning equipment
PROGRAM NAME:	Collections Enhancements to CC&B
BUSINESS UNIT:	C0589 - METER TO CASH
SPONSOR:	Martin Sultana
INITIATOR:	Kasia Bielska
BUSINESS CASE #:	2016-C0589-5C

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles,</i> To automate the processing of cheques received and wire payments, processed in EHM cash office. To prepare for extra volume of payments when monthly billing is implemented. This will avoid increasing headcount.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> When monthly billing comes into effect, this will ensure that payments are processed on a timely basis. This is to prevent an impact on customer's account. Small impact on operating costs for equipment, avoid additional headcount 60k approx. Avoid a delay in cash flow.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Automate notice: Residential customers
PROGRAM NAME:	Collections Enhancements to CC&B
BUSINESS UNIT:	C0589 - METER TO CASH
SPONSOR:	Martin Sultana
INITIATOR:	Kasia Bielska
BUSINESS CASE #:	2016-C0589-5D

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles,</i> Automate the final disconnect notice in winter season to identify the placement of a limiter rather than a full disconnect.

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Residential customers will receive more accurate and fewer notices for collections over the winter period, reducing customer confusion. Reduces number of trips that servicemen make to residences, freeing their time for performing disconnects. There will also be fewer mailings to residential customers.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT BUSINESS CASE	
PROJECT NAME:	2016 -Rolling Stock
PROGRAM NAME:	Fleet Replacement
BUSINESS UNIT:	C0584 - ROLLING STOCK
SPONSOR:	Chris Hudson - James Macumber
INITIATOR:	Brian Chamberlain
DEPARTMENTS INVOLVED:	Fleet Operation, Asset Management, Asset Operations
DATE SUBMITTED:	September-01-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0584 -1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
	System Service
X	General Plant

PROJECT DESCRIPTION/SUMMARY									
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> EHM develops a 5 year fleet capital plan as a tool for both short and long term budgeting and planning. This plan lists all current equipment and proposes the future replacement dates and costs, based on past experience and accepted industry standard vehicle lifecycles. Contributing to the proposed replacement date of individual vehicles are factors such as vehicle age, mileage, engine hours, operation costs, maintenance costs and general mechanical condition of the vehicle. After considering these factors, efforts are then made to smooth the annual capital expenditures. The proposed replacement ages [as per fleet replacement policy] are outlined below. Replacement policy is based on manufacturers recommendation, repair history and industry standards. <table border="0"> <tr> <td>• Light vehicles</td> <td>3-5 years or 170,000km.</td> </tr> <tr> <td>• Single buckets, dump trucks, cranes and 300 series vans</td> <td>8 years or 200,000 km.</td> </tr> <tr> <td>• Heavy vehicles</td> <td>12 years or 230,000 km.</td> </tr> <tr> <td>• Trailer and off road equipment</td> <td>15 years and or condition based</td> </tr> </table> Additional capital is required to meet equipment requirements for staff growth, resulting from succession planning and work program increases, refurbishing and tooling of existing equipment.		• Light vehicles	3-5 years or 170,000km.	• Single buckets, dump trucks, cranes and 300 series vans	8 years or 200,000 km.	• Heavy vehicles	12 years or 230,000 km.	• Trailer and off road equipment	15 years and or condition based
• Light vehicles	3-5 years or 170,000km.								
• Single buckets, dump trucks, cranes and 300 series vans	8 years or 200,000 km.								
• Heavy vehicles	12 years or 230,000 km.								
• Trailer and off road equipment	15 years and or condition based								
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> <table border="0"> <tr> <td>☐</td> <td>Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?</td> </tr> <tr> <td>☐</td> <td>Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?</td> </tr> </table>		☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?	☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?				
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?								
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?								

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

EHM requires a fleet of specialized vehicles and equipment to complete the many daily activities including the construction and maintenance of the electrical distribution system and to allow for quick restoration of power due to electrical distribution system disturbances. Degradation of fleet assets could jeopardize worker safety, inhibit maintenance activities and delay response time to outages.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Continue to manage fleet based on existing fleet policy*

OPTION 2: *Run vehicles to failure*

OPTION 3: *Lease vehicles*

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1 due to safety, opex lower, reliability higher, particularly important for "working" vehicles to ensure outside staff can work on jobs as planned, less downtime, etc.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Replacement of equipment that has failed or become damaged and is needed to maintain continuity of service.
	If project is mandatory, can this project be deferred? Required - Deferral of project not recommended and will impact the schedule for multi-year programs.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Trouble truck response times could be impacted by unreliable vehicles.
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk <u>Support:</u> Vehicles in poor condition or seen broken down by the public could impact corporate reputation.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Vehicles would not be allowed to degrade to the point of safety issues.	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u> No prevention of outages is achieved through the fleet program.	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 5 - ACA health index "Fair"
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? No	
	Anticipated start date: January-01-16	
	Urgency of implementation? 6 month to 1 year	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Potential to increase cost due to vehicle reliability and higher maintenance cost.	
	What level of uncertainty is associated to implementation (unknowns or variables)? Low	
	Do other projects rely on this project being completed? Require vehicles and equipment to accomplish most outside projects and asset maintenance.	

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 3 - > \$30,000	
	<u>Support:</u> Newer vehicles in better working condition operate more effectively and efficiently.		
	One-Time Costs	This project will incur/create one-time costs of: \$2,775,000	
	<u>Support:</u> See appendix for breakdown of vehicle types.		
	Ongoing Costs	This project will incur/create ongoing costs of: [Redacted]	
	<u>Support:</u>		
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu	Anticipated Derecognition
		What type of assets are being replaced? Vehicles	[Redacted] -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Bucket Trucks	\$ 1,190,000
Dump Trucks	\$ 535,000
Pickup Trucks	\$ 645,000
Trailers	\$ 120,000
Vans	\$ 285,000
Total	\$ 2,775,000

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project									
Work Order(s):	<i>Please specify</i>								
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #ffcc00;"> <td style="width: 40%; padding: 5px;"> Cost Efficiencies <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> This project will save or avoid operational costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$2,775,000 <i>Variance:</i> <u>(\$2,775,000)</u> <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> This project will incur/create one-time costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> This project will incur/create ongoing costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> How much derecognition expense resulted from this project? - - <u>Support/Explanation:</u> Comments... </td> </tr> </table>	Cost Efficiencies <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments...	This project will save or avoid operational costs of:	One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$2,775,000 <i>Variance:</i> <u>(\$2,775,000)</u> <u>Support/Explanation:</u> Comments...	This project will incur/create one-time costs of:	Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	This project will incur/create ongoing costs of:	Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	How much derecognition expense resulted from this project? - - <u>Support/Explanation:</u> Comments...
Cost Efficiencies <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments...	This project will save or avoid operational costs of:								
One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$2,775,000 <i>Variance:</i> <u>(\$2,775,000)</u> <u>Support/Explanation:</u> Comments...	This project will incur/create one-time costs of:								
Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	This project will incur/create ongoing costs of:								
Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	How much derecognition expense resulted from this project? - - <u>Support/Explanation:</u> Comments...								

<u>ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED</u>			
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.			
Business Values	Performance Categories		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #f08080;"> <td style="width: 40%; padding: 5px;"> <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Replacement of equipment that has failed or become damaged and is needed to maintain continuity of service. <u>Support:</u> Comments... </td> <td style="padding: 5px;"> If project is mandatory, please select one of the following: </td> </tr> </table>	<i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Replacement of equipment that has failed or become damaged and is needed to maintain continuity of service. <u>Support:</u> Comments...	If project is mandatory, please select one of the following:
<i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Replacement of equipment that has failed or become damaged and is needed to maintain continuity of service. <u>Support:</u> Comments...	If project is mandatory, please select one of the following:		

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - ACA health index "Fair" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	GREEN ENERGY - FIT & MicroFIT PROJECTS
PROGRAM NAME:	2016 GREEN ENERGY - FIT & MicroFIT PROJECTS
BUSINESS UNIT:	C0900 - GREEN ENERGY - FIT & MICROFIT PROJECTS
SPONSOR:	James Macumber
INITIATOR:	Branko Boras
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	September-14-15
DATE APPROVED:	
DATE STARTED:	January-01-16
DATE COMPLETED:	December-31-16
BUSINESS CASE #:	2016-C0900-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Enacted in May 2009, the Green Energy Act ("GEA") was introduced to encourage renewable generation, energy conservation and the creation of green jobs. A key GEA element to enable renewable generation is the IESO's FIT program. The FIT program is divided into two streams: large projects above 10 kW and up to 500 kW follow the FIT process for connection; and smaller projects of 10 kW or less follow the microFIT process for connection. Typically, it is residential customers which apply for microFIT projects whereas business and large industrial customers apply for the FIT projects. Enersource has the responsibility to connect renewable generators in accordance with the IESO's FIT program rules, OEB codes, ESA requirements and Enersource standards, as outlined in the company's Conditions of Service.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Enersource is required by the OEB's Distribution System Code ('DSC') and the IESO's Feed-In Tariff program rules to facilitate connection of FIT and MicroFIT generation projects.

Enersource continues to connect renewable generators to its distribution system. Table 2 below provides the total number of FIT and microFIT applications received by Enersource as of the end of June, 2015. These figures include all projects listed on the IESO's FIT Application Management Environment (FAME) and microFIT LDC Admin web portals, as well as all projects for which initial capacity checks have been requested to be performed by Enersource, and which may or may not be registered with the IESO. Table 2 also provides a summary of the number of renewable energy projects connected as of the end of June, 2015, and the corresponding total installed capacity for those projects.

The forecasted microFIT and FIT connections in 2016 are expected to be 65 and 30 projects, respectively.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: ***Remain status quo and not actively facilitate connection of renewable generation projects.***

Failure to connect renewable generation projects would be in direct violation of the DSC and the market rules.

OPTION 2: ***Continue to facilitate connection of renewable generation projects.***

This option ensures that Enersource complies with the DSC and market rules.

OPTION 3:

Explanation

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1:

This is not a satisfactory option because Enersource would be in direct violation of the OEB's DSC and the market rules.

Option 2:

This option would ensure timely connection of renewable generation projects to Enersource's distribution system and thereby, full compliance with the DSC and the market rules.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Enersource is required by the DSC to connect renewable generation projects in support of the Green Energy Act.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 10 - Improvement from non-compliance to compliance <u>Support:</u> - Avoids fines from the OEB and MOE - Ensure compliance with the legislation/regulation
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Promote renewable generation within Mississauga and facilitate connection of residential and commercial/industrial renewable projects
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> This projects ensures preservation of Enersource's brand through continued commitment of connecting renewable generation projects to the distribution system.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 3 - Low environmental impact
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? 6 month to 1 year
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? High - regulatory compliance will be at risk and fines may be levelled from government bodies..
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? n/a

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies Support:	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs Support: Comments...	This project will incur/create one-time costs of: \$155,000	
	Ongoing Costs Support:	This project will incur/create ongoing costs of: -	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced?	Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Table 2: Renewable Connections as of June 30, 2015

Type of Renewable Generation	Number of Applications Received	Total Number of Projects Connected	Total kW of Projects Connected
MicroFIT (≤ 10 kW)	1,277	274	1,939
FIT (> 10 kW)	1,025	64	11,166
Total	2,302	338	13,105

Table 3: Actual/Forecast of Renewable Generation Project Connections

	Actual						New forecast	
	2010	2011	2012	2013	2014	2015 YTD	2015	2016
Actual/Forecast Number of Renewable Generation Projects Connected								
microFIT	28	35	57	64	41	49	80	65
FIT	0	10	6	9	26	13	20	30
Total	28	45	63	73	67	62	100	95
Actual/Forecast Total kW of Renewable Generation Projects Connected (kW)								
microFIT	149	226	346	420	326	472	700	570
FIT	0	1,725	1,185	2,100	4,412	1,744	3,500	5,250
Total	149	1,951	1,531	2,520	4,738	2,216	4,200	5,820
Actual/Forecast Number of Renewable Generation Projects Applications Received								
microFIT	547	221	212	176	121	200	175	
FIT	378	239	195	62	151	200	100	
Total	925	460	407	238	272	400	275	

PROJECT APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$155,000 <i>Variance:</i> (\$155,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu <i>Final Assessment:</i> Project required to become or remain compliant with applicable legislation and/or regulation <i>Initial Assessment:</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Improvement from non-compliance to compliance <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Low environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



Enersource Hydro Mississauga Inc.

Light Rail Transit (“LRT”)

2016-2021

Hurontario Light Rail Transit ("LRT")

Light Rail Transit ("LRT") is a transportation system being developed by the Province of Ontario to connect Mississauga's Port Credit neighbourhood and Brampton. The LRT project supports Mississauga's vision of becoming a vibrant and modern urban centre and ensures the long-term urban intensification of downtown Mississauga. With the development of LRT infrastructure, downtown Mississauga will be within a five-minute walk of a transit station. As a result, five transit stations are proposed within the Downtown that will require installation or relocation of electrical distribution infrastructure by Enersource. The current proposed scope of the LRT system is shown in **Figure 1**. With the development of the LRT system, Enersource will have to ensure that new distribution infrastructure is built, as well as the reconfiguration of the existing distribution network is carried out to ensure adequate supply to the downtown core. The new transit line would serve Mississauga and Brampton along the Hurontario-Main corridor, running between Port Credit and Brampton GO Stations, and connecting with existing transit routes in the GTA.

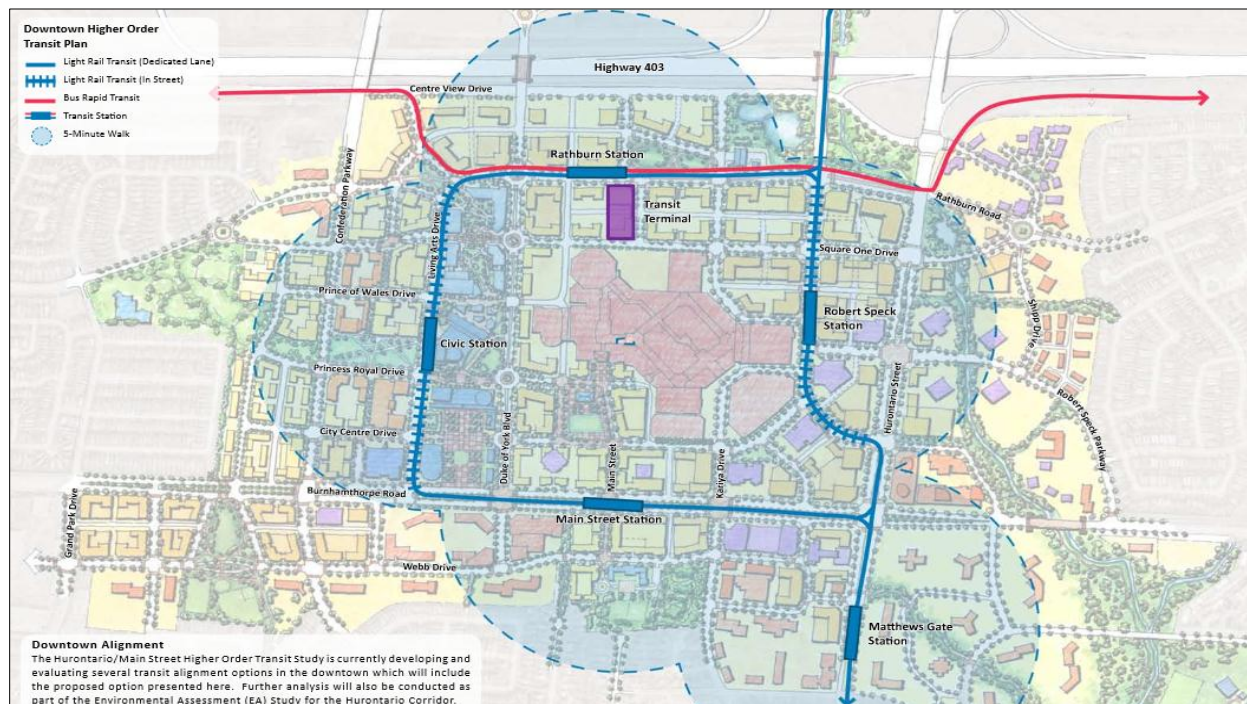


Figure 1. LRT plan.

In April 2015, the Province of Ontario announced that the LRT project is moving ahead in support of the Moving Ontario Forward plan aimed at increasing transit ridership, reducing travel times, managing congestion, connecting people to jobs, and improving the economy. Currently, the construction of the LRT is expected to start in approximately 2018 and the in-service date is expected to be in 2022. Consequently, Enersource has made provisions in its capital budgets under the system access

investment category to ensure adequate funds are available to carry out the work required to accommodate construction of the LRT (e.g. relocation of overhead assets). The total net project costs are expected to be \$23.0M, with gross costs of \$35.2M offset by contributions from Metrolinx totaling \$12.2M.

(\$000's)	2016	2017	2018	2019	2020	2021	Total
Design	400	400	250	250			1,300
Underground		4,000	4,400	4,500	4,300	700	17,900
Overhead		4,000	4,000	4,000	3,500	500	16,000
Subtotal	400	8,400	8,650	8,750	7,800	1,200	35,200
Contribution (Metrolinx)		(3,000)	(3,000)	(3,000)	(3,000)	(200)	(12,200)
Total	400	5,400	5,650	5,750	4,800	1,000	23,000



Appendix B.14

Utility Relocation Strategy Guidelines

HURONTARIO-MAIN LRT PROJECT

Preliminary Design/TPAP

Utility Relocation Strategy Guidelines

June 2014

508956-4151-40EM-0001





Utility Relocation Strategy Guidelines

508956-4151-40EM-0001-0

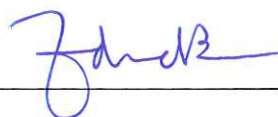
9 June 2014



 SNC • LAVALIN	Utility Relocation Strategy Guidelines		Date:	2014/06/09
	DOCUMENT NO.:	508956-4151-40EM-0001-0	Revision No.:	0

CLIENT: **City of Mississauga and City of Brampton**

PROJECT: **Hurontario-Main LRT
Preliminary Design/TPAP**

Prepared by:	SNC-Lavalin Inc. Edmund Wong Engineer in Training	
Reviewed by:	Asen Delchev Project Engineering Manager	
Approved by:	Chris McCarthy Project Manager	

REVISION INDEX

Revision No.	Prepared Date	Reviewed Date	Approved Date	Pages Revised	Remarks
0	2014/06/09	2014/06/09	2014/06/09		

Table of Contents

1.0	INTRODUCTION.....	1
2.0	CONFLICT IDENTIFICATION.....	2
2.1	UTILITY RESTRICTION AREA DEFINITION	2
2.2	CONFLICT CRITERIA.....	3
2.2.1	Watermains and Sewers	3
2.2.2	Gas lines, Hydro and Communication Ducts.....	3
2.3	CONFLICT CRITERIA SUMMARY	4
3.0	RELOCATION STRATEGY	7
3.1	UTILITY CLEARANCE GUIDELINES.....	7
3.2	WATERMAIN CLEARANCE.....	8
3.3	CROSSING UTILITIES.....	8
3.4	TRAFFIC UTILITIES.....	8
3.5	GAS LINES, HYDRO AND COMMUNICATION DUCTS	8
3.6	RELOCATION CRITERIA SUMMARY.....	8
4.0	DISCLAIMER	11

1.0 Introduction

The Hurontario / Main LRT project is the provision of light rail transit (LRT) between Lakeshore Road East and Nelson Street East along Hurontario Street / Main Street corridor.

A review of the conflicts of the LRT system with the utilities and services along the Hurontario / Main corridor will be carried out and a relocation strategy has been developed to identify conflicts with municipal services and private utilities at the preliminary engineering level.

This work will be performed as an iterative process. Once the major conflicts are identified and a new location is proposed, the configuration will be analyzed for new conflicts at the new location. This will be done until all utilities and services in the corridor are indicatively accommodated. During this process, the City of Mississauga, the City of Brampton and the Region of Peel will be consulted, any concerns about the relocations will be addressed and appropriate changes to the strategy will be made.

The conflict identification is based on the present location of the utilities and services as shown on the base survey map provided by the City. Fire hydrant leads and catch basin leads are not shown on the City base information, however they are assumed to be connected to the closest watermain or storm sewer, and any changes in length or need for protection will be quantified.

As this is a preliminary strategy, the main goal is to identify the conflicts and needs for relocation. In the future, such strategy should be evaluated and updated based on further input from the City and all utility and service companies involved.

This report outlines the criteria to be used for identification of conflicts and guidelines for the relocation strategy.

All the utilities considered in the relocation strategy are based on the existing network without consideration for improvements. The guidelines are intended to show what utility relocations along the corridor directly result from the LRT project, and thus have their relocation costs attributable to the project. As the procurement strategy for the project is yet to be determined, it is unclear how the utility relocation will be undertaken. Nevertheless, it is assumed that in all cases, the LRT-caused relocation costs will be paid for out of the overall project budget, and that the design of relocated utilities will conform to the standards of the authority having jurisdiction.

Various jurisdictions may use the construction of the line as an opportunity to undertake future utility upgrades; however these are not considered to be within the scope and budget of the LRT.

2.0 Conflict Identification

2.1 Utility Restriction Area Definition

Subsurface infrastructure along the corridor is comprised of watermains, sewers, gas lines, electrical utilities and communication infrastructure.

The introduction of an LRT system into a corridor with existing subsurface infrastructure creates conflicts, particularly since when subsurface infrastructure parallel to the tracks requires servicing, LRT service must be interrupted. Therefore, to minimize service interruptions and to ensure safety of workers, direct physical obstructions, such as maintenance holes in the right-of-way of the LRT should be eliminated. Infrastructure under the track, if not removed, will be exposed to the LRT vehicle's load and vibration forces as well as the potential of corrosion from stray currents along the track. To minimize these impacts, the subsurface infrastructure must be moved out of the Utility Restriction Area.

For the purpose of this review, the Utility Restriction Area is identified as 1 m to either side of the guideway and 1.8 m below the top of rail (see Figure 2.1). Infrastructure which crosses perpendicular to the track is to be maintained, but must be protected from surface loads and stray current.

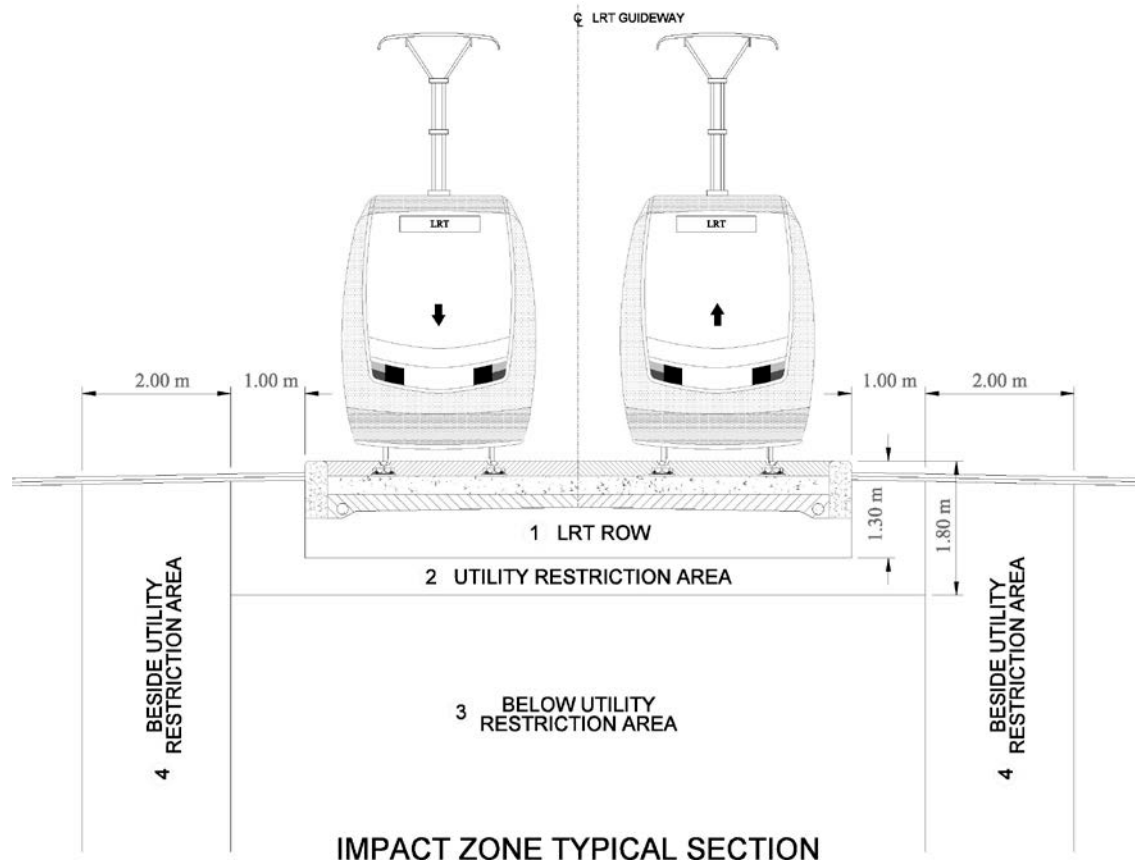


Figure 2.1 – Utility Restriction Area

2.2 Conflict Criteria

2.2.1 Watermains and Sewers

Watermains and sewers (sanitary and storm) running parallel within the Utility Restriction Area are identified as in conflict and requiring relocation (see Table 2.1). Watermains and sewers, including fire hydrant leads and catch basin leads, crossing the Utility Restriction Area perpendicularly, which need to be maintained in their location, are identified as requiring protection for the length in which they were within the LRT impact zone.

2.2.2 Gas lines, Hydro and Communication Ducts

It is assumed that gas lines, hydro and communication ducts generally have sufficient cover under the track bed are assumed. As such, these utilities will be identified as in conflict according to Table 2.1. However, when existing access to these utilities (i.e. a maintenance hole) is located within the new guideway, this access will be identified as in conflict. As a result, the utilities leading to the access are also in conflict and required relocation.

2.3 Conflict Criteria Summary

All the criteria under which utilities and services are identified as needing relocation are summarized in Table 2.1.

Table 2.1: Conflict Criteria

Type of Utilities	Zone 1 Utility Free Area (Top of Rail to 1.3m Below Top of Rail)	Zone 2 Utility Restriction Area (1.3 to 1.8m Below Top of Rail)	Zone 3 Below Utility Restriction Area (1.8m from Top of Rail to Centre of Earth)	Zone 4 Beside Utility Restriction Area (2.0m Width to Centre of Earth)
Existing Longitudinal				
Watermains	Relocate	Relocate	Relocate	Up to 300mm dia-relocate Over 300mm dia-may remain
Sanitary Sewer	Relocate	Local – Relocate Large trunk or sub-trunks – may remain if access can be secured through Zone 1 or by offset access chambers (subject to approval of the Region of Peel Water & Wastewater Division with the Public Works, and also depending on the age & condition of the pipe)	Local – Relocate Large trunk or sub-trunks – may remain if access can be secured through Zone 1 or by offset access chambers (subject to approval of the Region of Peel Water & Wastewater Division with the Public Works, and also depending on the age & condition of the pipe)	May remain
Storm Sewer	Relocate	May remain if access can be secured through Zone 1 or by offset access chambers (subject to approval of the Municipality's Water Department, and also depending on the age & condition of the pipe)	May remain if access can be secured through Zone 1 or by offset access chambers (subject to approval of the Municipality's Water Department, and also depending on the age & condition of the pipe)	May remain
Hydro, Tele-Comm Cables, Traffic Signals	Relocate	Relocate	Relocate	May Remain
Gas	Relocate	Relocate	Relocate	Uncased gas pipelines must be relocated

Type of Utilities	Zone 1 Utility Free Area (Top of Rail to 1.3m Below Top of Rail)	Zone 2 Utility Restriction Area (1.3 to 1.8m Below Top of Rail)	Zone 3 Below Utility Restriction Area (1.8m from Top of Rail to Centre of Earth)	Zone 4 Beside Utility Restriction Area (2.0m Width to Centre of Earth)
Existing Crossings				
Watermains	Relocate	May be replaced with line in steel casing Access chambers shall be relocated	May be replaced with line in steel casing Access chambers shall be relocated	May Remain
Water Service Connections	Relocate	Relocate to below URA	May remain	May Remain
Sanitary Sewer	Relocate	May Remain Access chambers shall be relocated	May Remain Access chambers shall be relocated	May Remain
Sanitary Sewer Connections	Not Permitted	Relocate to be below URA if grade permits otherwise replace service in URA zone	May remain	May Remain
Storm Sewer & Service Connections	Not Permitted	May remain Access chambers may protrude through Zone 1 or shall be relocated	May remain Access chambers may protrude through Zone 1 or shall be relocated	May Remain
Hydro, Tele-Comm Cables, Traffic Signals Including Local Connections	Relocate	In duct & encased – may remain In duct only – may remain if encased No duct – include duct & encase or relocate	In duct & encased – may remain In duct only – may remain if encased No duct – include duct & encase or enclose or relocate	May Remain
Gas & Gas Services	Relocate	May remain if enclosed in steel casing	May remain if enclosed in steel casing	May Remain if enclosed in steel casing

In addition, the following utilities are considered in conflict:

Utilities/Services	Relocation required if:
Cable Pedestals	- In conflict with: - Guideway - New Curb - New Sidewalk
Catch Basins	Not in line with the new curb
Catch Basin Leads	Catch Basin relocated
Fire Hydrants	- Less than 600 mm from edge of curb - In conflict with the new sidewalk - In conflict with new stop structure - New Fire Hydrant Lead less than 1m in length
Fire Hydrant Leads	Fire Hydrant relocated
Concrete/Wooden Hydro Poles	- Less than 600 mm from edge of curb - In conflict with the new sidewalk - In location of new Sewer or Watermain
Utility Light Standard	- Less than 600 mm from edge of curb - In conflict with the new sidewalk - In location of new Sewer or Watermain - Utility Light Standard not relocated in new platform locations
Traffic Utilities Include: Traffic Light Posts, Controllers, Junction Boxes, Vehicles and Pedestrian Signal Heads, and Road Signs	- In conflict with: - Guideway - New Roadway - New Curb - New Utility location (i.e. Watermain)

3.0 Relocation Strategy

3.1 Utility Clearance Guidelines

A relocation strategy will be developed for the utilities and services found to be in conflict.

Clearance guidelines were compiled using guidelines from the Region of Peel, supplemented by standards from the Ministry of Environment. Generally the Region's standards are more stringent, and therefore will take precedence. The required spacing between services is summarized in Table 3.1.

Table 3.1: Minimum Spacing between Services

	Property Line	Storm/ Sanitary Sewer (outer edge)	Watermain (outer edge)
Storm/ Sanitary Sewer (outer edge)	3 m	0.5 m minimum	2.5 m minimum; if less, must have 0.5 m vertical clearance
Watermain (outer edge)	3 m	2.5 m minimum; if less, must have 0.5 m vertical clearance	–
Hydro Ducts	1.75 m	–	–
Gas Main	0.75 m	–	–
Bell Ducts	1.75 m	–	–

In the information provided by the city, profile view was not provided for all utilities. Watermain profiles will be obtained from the Region of Peel, and this will be used to assess the criteria of 0.5 m vertical clearance from sewers.

These guidelines will be applied wherever possible; with the exception of some locations along the corridor, where the right-of-way is too narrow to accommodate the requirements. These situations will be examined in more detail, taking into account the length of conflict and risk of a lower clearance in each individual case. Upon examination, minimum spacing will be lowered in situations where it is appropriate.

The design of the relocated utilities shall also account for the long-term vision for the corridor, inclusive of future space allocations for widened sidewalks, bike lanes and landscaping. As such, designs must not relocate utilities into locations where they will be subject to conflict with future infrastructure (e.g. tree roots).

3.2 Watermain Clearance

Clearance between parallel watermains is based on the space required for installation and compaction of backfill. This is assumed to be 0.3 m.

3.3 Crossing Utilities

Watermains and sewers, including fire hydrant leads and catch basin leads, crossing the Utility Restriction Area perpendicularly that has to be maintained in the current location will be identified as requiring protection from the surface loading and stray current. This protection is assumed to be installed for the length of the utility within the utility restriction area.

3.4 Traffic Utilities

Traffic utilities, including traffic light posts, controllers, junction boxes, vehicle and pedestrian signal heads, and road signs, will be identified as in conflict. Relocation strategy is not defined at this stage.

3.5 Gas lines, Hydro and Communication Ducts

Gas lines, hydro and communication ducts will be identified as needing relocation when there is change to the depth of cover. This occurs when the original utility is under the existing sidewalk but is to be located under the new roadway in the new design. As depth of cover is compromised, relocation of utility is required to move under the new sidewalk. Ducts that remain or are relocated to beneath the LRT guideway are considered to have sufficient depth of cover (see Figure 2.1), and do not pose a structural risk to the structure of the guideway. In fact, the system itself has a system-wide duct bank under the guideway for exclusive system use. When new Hydro Poles are installed, Clear Zone requirements will be maintained.

3.6 Relocation Criteria Summary

New location of utilities and services will be determined by the criteria summarized in Table 3.2.

Table 3.2: Relocation Criteria

Utility/Service	New Location Criteria
Bell Ducts	• Maintaining minimum clearance • Not on top of alignment of new Sewers or Watermain • Connecting to relocated or existing Bell Maintenance Holes
Coaxial Cables	• Maintaining minimum clearance • Not on top of alignment of new Sewers or Watermain • Connecting to relocated or existing Cable Pedestals
Gas mains	• Maintaining minimum clearance • Not on top of alignment of new Sewers or Watermain

Utility/Service	New Location Criteria
Hydro Ducts	• Maintaining minimum clearance • Not on top of alignment of new Sewers or Watermain • Connecting to relocated or existing Hydro Maintenance Holes • Cased for protection when crossing the Utility Restriction Area
Sewers (Sanitary, Storm)	• Maintaining minimum clearance • Cased for protection when crossing the Utility Restriction Area
Sewer Maintenance Holes	• Relocated, keeping the same spacing • Not relocated in sections where Sewers are in Utility Tunnel • Some new added for new connections
Watermains	• Maintaining minimum clearance • Sleeved for protection when crossing the Utility Restriction Area sleeved • Valve Chambers, Valve Boxes and Tee Connections replaced, keeping the spacing • Valve Chambers and Boxes Not relocated in sections where Watermains are in Utility Tunnel
Catch Basins	• Relocated to new edge of curb • Spacing between Catch Basins generally not modified, except at stop platform locations
Catch Basin Leads	• Cased when crossing Utility Restriction Area • Extended or reduced to new location
Fire Hydrants	• Min 600 mm from edge of curb • Relocated to opposite side of street when in conflict with new stop structure
Fire Hydrant Leads	• Assumed 150 mm pipe • Sleeved when crossing Utility Restriction Area • Minimum length of 1 m
Concrete/Wooden Hydro Poles	• Min 600 mm from edge of curb. Maintain Clear Zone requirements; install Break away poles in locations where Clear Zone is not possible to maintain
Utility Light Standards	• Min 600 mm from edge of curb. Maintain Clear Zone requirements; install Break away poles in locations where Clear Zone is not possible to maintain ULS not relocated in new platform locations
Traffic Utilities	• Conflicts identified; no new location shown on drawings

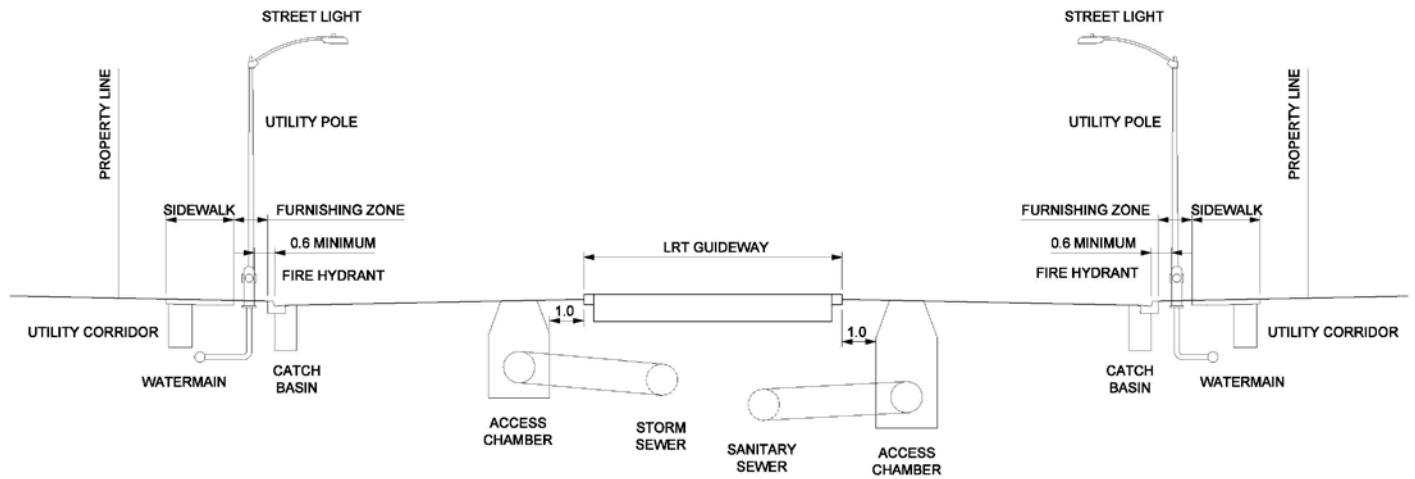


Figure 3.6 – Utility Relocation Diagram

Disclaimer

This document contains the expression of the professional opinion of SNC-Lavalin Inc. and/or its sub-consultants (hereinafter referred to collectively as “the Consultant Team”) as to the matters set out herein, using their professional judgment and reasonable care. It is to be read in the context of the agreement (the “Agreement”) between SNC-Lavalin Inc. and the City of Mississauga and City of Brampton (the “Client”) the methodology, procedures, techniques and assumptions used, and the circumstances and constraints under which its mandate was performed. This document is written solely for the purpose stated in the Agreement, and for the sole and exclusive benefit of the Client, whose remedies are limited to those set out in the Agreement. This document is meant to be read as a whole, and sections or parts thereof should thus not be read or relied upon out of context.

The consultant team has, in preparing the Agreement outputs, followed methodology and procedures, and exercised due care consistent with the intended level of accuracy, using professional judgment and reasonable care.

However, no warranty should be implied as to the accuracy of the Agreement outputs, forecasts and estimates. This analysis is based on data supplied by the client/collected by third parties. This has been checked whenever possible; however the consultant team cannot guarantee the accuracy of such data and does not take responsibility for estimates in so far as they are based on such data.

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DOCUMENT END



PROJECT BUSINESS CASE	
PROJECT NAME:	Maintenance and Replacement of Residential and Commercial Smart Meters
PROGRAM NAME:	
BUSINESS UNIT:	C0598 - METERING EQUIPMENT
SPONSOR:	Doug Morrison
INITIATOR:	David Rankin
DEPARTMENTS INVOLVED:	Metering, Billing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0598-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> - Maintenance and repair of metering equipment for all metering installations in the city of Mississauga - Analysis of metering installations to ensure accurate and correct usage data is provided for the purposes of billing - New service installations for small commercial customers - Operation and Maintenance of the back-office metering system applications (PrimeRead, MAS etc.)	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Under MC regulations, retail electricity customers require a revenue meter for measuring and billing electricity use. EHM owns and operates approximately 210,000 retail revenue meters. Historically, approximately 500 of these revenue meters are removed or replaced each year due to random failures, damage or functional obsolescence. In addition, on average 500 meters are removed and replaced as part of meter verification requirements defined in regulations administered by Measurement Canada. Meter verifications are carried out in compliance with Measurement Canada rules.

New installations support the growth of EHM's customer base and the operation and maintenance of new and existing metering equipment and back office systems which collect and provide automated meter reading data for billing EHM customers. The reliability of the metering equipment and back office AMI systems is paramount to the on-going billing of all Enersource customers and directly impacts EHM's revenue stream. New installation must be completed within specific timeframes and are governed by the OEB regulations. Equipment must be available in sufficient quantities to allow timely completion of this work. Maintenance of existing metering installations remains a critical function to ensure consistent and complete data for billing on a regular basis and to provide data to the provincial MDM/R as mandated in the Functional Specification for an Advanced Metering Infrastructure dated July 5, 2007.

PROGRAM	Budget
- Maintenance and Replacement of Small Commercial non-demand meters	\$192,000
- Maintenance and Replacement of Residential meters	\$155,000

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Contract out maintenance of metering equipment**

OPTION 2: **Perform Metering maintenance with Enersource staff**

OPTION 3: **No Other options were consider for maintenance of existing metering equipment**

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

- Maintain sufficient inventory to ensure low cost, readily available inventory for maintenance requirements throughout the given year.
- Maintain metering equipment at or above industry standards
- Ensure continued compliance to Measurement Canada specifications with regard to metering equipment standards
- Ensure compliance to the Measurement Canada Meter Verification standards
- Provide high level of customer service

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Measurement Canada, IESO and OEB requirements and performance targets are achieved, maintained and supported by ongoing maintenance.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality <u>Support:</u> Comments...	Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR
	Customer Satisfaction <u>Support:</u>	Does this project add Customer Value? 0 - No impact on Customer Service
	Reputational Risk <u>Support:</u> Long term outages may negatively impact EHM's brand/reputation.	Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
<u>Support:</u>		
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu
	<u>Support:</u> This project supports the health of the smart metering network and is to maintain service and replace failed equipment in the field.	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes	
	Anticipated start date: January-01-16	
	Urgency of implementation? 6 month to 1 year	And/or enter specific deadline/implementation date: Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? Impact of not repairing failed equipment: - Negative impact on revenue due to incorrect or estimated billing - Negative impacts on OEB performance targets - Non-compliance with MC regulations/specifications for metering	
	What level of uncertainty is associated to implementation (unknowns or variables)? Low	
	Do other projects rely on this project being completed? No	

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount			
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$377,000			
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 			
	Impact on Distribution Rates / Revenue Requirement	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; border-bottom: 1px solid black;"> What is the age of the assets being replaced? Select from drop-down menu </td> <td style="width: 40%; border-bottom: 1px solid black; text-align: right;"> Anticipated Derecognition </td> </tr> <tr> <td style="border-bottom: 1px solid black;"> What type of assets are being replaced? Meters, Collector Meters, CTs/PTs </td> <td style="border-bottom: 1px solid black; text-align: right;"> - </td> </tr> </table>	What is the age of the assets being replaced? Select from drop-down menu	Anticipated Derecognition	What type of assets are being replaced? Meters, Collector Meters, CTs/PTs
What is the age of the assets being replaced? Select from drop-down menu	Anticipated Derecognition				
What type of assets are being replaced? Meters, Collector Meters, CTs/PTs	-				

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$377,000</u> <i>Variance:</i> <u>(\$377,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required to become or remain compliant with applicable legislation and/or regulation</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	New Installations for Residential, Small and Large Commercial Metering
PROGRAM NAME:	
BUSINESS UNIT:	C0598 - METERING EQUIPMENT
SPONSOR:	Doug Morrison
INITIATOR:	David Rankin
DEPARTMENTS INVOLVED:	Metering, Billing, Customer Service, Engineering Construction
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0598-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

This project is to provide metering for new customers or upgrades to existing customers, maintenance of our existing metering system and the execution of specific projects intended to improve the efficiency and effectiveness of our metering system. An accurate metering system in compliance with all applicable regulatory requirements is an essential part of running an electrical distribution utility. Our billing system requires accurate and timely customer consumption data in order to bill our customers and help maintain the revenue necessary to run this utility. Providing daily consumption data is a mandatory requirement of the IESO MDM/R. Maintenance of the metering system ensures EHM meets the daily target of 98% completeness of the data provided.

New metering installations are a requirement to support the growth of EHM's customer base. Operation and maintenance of existing metering equipment is necessary in order to collect and provide automated meter reading data as the first stage of Enersource's meter to cash process. The reliability and accuracy of the metering equipment is paramount to the on-going billing of all Enersource customers and directly impacts Enersource's revenue stream. The vast majority of the meters are now SMART meters or meters that can be read remotely. Maintenance of existing metering installations as well as their communication components remains a critical function to ensure consistent and complete data for billing on a daily basis and to provide data to the provincial MDM/R. Incorrect installation or setup and/or lack of maintenance could result in a metering failure resulting in loss of revenue and possible damage to Enersource's reputation.

PROGRAM	BUDGET
- New Installations for Residential Meters	\$170,000
- New Installations Small Comm Non-Demand	\$200,000
- New Installations Large Comm/Ind with Demand	\$175,000

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: ***Execute installation of new metering equipment within the OEB mandated timeframe of 5 days. Ensure adequate inventory availability to support new equipment installations as requested by Developers.***

OPTION 2:

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Enersource is mandated by the Ontario Energy Board to provide metering equipment in support of new service requests within a 5-day window from the date of the original request. Enersource must maintain an adequate level of inventory to be ready to install metering related equipment during this time.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Deferral outside the 5-day window will result in non-compliance with the OEB mandated timeframe and could result in sanctions.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Completing the installation of the requested equipment prevents the degradation of the New Service Connection ESQR.
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Early or on-time completion can result in improved customer value by helping developers/builders reach their own targeted timeframes for electrical service provision.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk <u>Support:</u> Enersource reputation can be positively impacted through consistent on-time completion of this service provision. Non compliance to the 5 day OEB performance window could mean sanctions against EHM and result in negative industry impact to reputation.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: Select from drop-down menu
	<u>Support:</u> Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu
	<u>Support:</u> Comments...	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes	
	Anticipated start date: January-01-16	
	Urgency of implementation? < 3 months	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Deferring work would result in non-compliance with OEB mandated timeframes and negatively impact ESQRs.	
	What level of uncertainty is associated to implementation (unknowns or variables)? Low	
	Do other projects rely on this project being completed? There is a potential of other projects being impacted by this project.	

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: Select from drop-down menu	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$545,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? None	Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Select from drop-down menu</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$545,000</u> <i>Variance:</i> <u>(\$545,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required to become or remain compliant with applicable legislation and/or regulation</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	PMU - Maintenance - Failure
PROGRAM NAME:	
BUSINESS UNIT:	C0598 - METERING EQUIPMENT
SPONSOR:	Doug Morrison
INITIATOR:	David Rankin
DEPARTMENTS INVOLVED:	Metering, Engineering operations, billing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0598-3

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Primary Metering Unit failure in the field can have a catastrophic impact on customers. This equipment is essential to provision of electrical services to large Commercial/Industrial customers.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Contract out to Third party**

Due to the immediate customer impact and timing of repairs/replacement use of a third party contractor was rejected as an option.

OPTION 2: **Perform work with Enersource staff**

- Shorter reaction time
- in house expertise related to field equipment and plant

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Enersource staff have the expertise and can be dispatched within a very short period of time to ascertain the damage and determine the appropriate steps to return service to the customer. Replacement of failed equipment can usually be completed within days, depending on the availability of replacement equipment.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project identified as a result of customer request
	If project is mandatory, can this project be deferred? Desired – Deferral of project can be accommodated and may not impact or displace projects in future years.
	<u>Support:</u> Alternative provisions can be applied to temporarily resolve the issue until equipment can be replaced.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Emergency Trouble call - response within 1 hour could be impacted
	Customer Satisfaction Does this project add Customer Value? 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> Primary Metered user impact on business and timing of repair/replacement could impact business. Quick turnaround on repairs maintains the customer's business viability and EHM's reputation and ESQR rating.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk <u>Support:</u> Comments...Business losses could be significant if the repair/replacement is not completed in a timely manner. ESQRs could be negatively impacted.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor"
	<u>Support:</u> Replacements are due to equipment failure.	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: < 3 months 2016
	What is the impact of deferring or not meeting the specified deadline date? Possible loss of revenue for customer, sanctions or fines from the OEB.
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: Select from drop-down menu	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$150,000 Costs are in relation to a potential 5 failure in a one year period.	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Select from drop-down menu</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$150,000</u> <i>Variance:</i> <u>(\$150,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project identified as a result of customer request</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - ACA health index "Very Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	PMU - New Installs
PROGRAM NAME:	
BUSINESS UNIT:	C0598 - METERING EQUIPMENT
SPONSOR:	Doug Morrison
INITIATOR:	David Rankin
DEPARTMENTS INVOLVED:	Metering, Engineering Operations, Billing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0598-4

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

This project is to provide primary metering for new customers or upgrades to existing customers and the execution of specific projects intended to improve the efficiency and effectiveness of our metering system. An accurate metering system in compliance with all applicable regulatory requirements is an essential part of running an electrical distribution utility. Our billing system requires accurate and timely customer consumption data in order to bill our customers and help maintain the revenue necessary to run this utility.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

There are no alternatives to providing metering for new installations for new or upgraded services as we are required by regulation to provide service.

OPTION 2:

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project identified as a result of customer request
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> New Installations are governed under OEB regulations and subject to specific time frames for completion. Enersource would fall into non-compliance if this work was not completed within the guideline/timeframes required.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR
	<u>Support:</u> Comments...Meets new installation ESQR	
	Customer Satisfaction	Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable)
	<u>Support:</u> Timely completion results in OEB compliance and the customer's ability to progress on building, occupying their premise.	
	Reputational Risk	Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk
	<u>Support:</u> Timely completion results in OEB compliance and the customer's ability to progress on building, occupying their premise.	

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
<u>Support:</u>		
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu
	<u>Support:</u> Comments...	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes	
	Anticipated start date: January-01-16	
	Urgency of implementation? < 3 months	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Non Compliance with OEB timeframes could result in sanctions or fines.	
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium	
	Do other projects rely on this project being completed? Non Compliance with OEB timeframes could result in sanctions or fines.	

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: Select from drop-down menu	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$100,000 Cost are reflective of 5 target new installations within the year.	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Select from drop-down menu</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$100,000</u> <i>Variance:</i> <u>(\$100,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project identified as a result of customer request</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	SYSTEM ACCESS
PROGRAM NAME:	2016 - 2021 SYSTEM ACCESS
BUSINESS UNIT:	Select from drop-down menu
SPONSOR:	PAUL SIDHU
INITIATOR:	PAUL SIDHU
DEPARTMENTS INVOLVED:	ASSET OPERATIONS, ASSET MANAGEMENT, PURCHASING
DATE SUBMITTED:	September-25-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0541/C0542/C0544-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
x	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

New Subdivisions

New subdivisions are non discretionary projects initiated by developers where investment is required to enable customers to connect to Enersource's distribution system. They are generally in new subdivisions or condominium buildings and as such development is dependant on the local economy.

Industrial & Commercial Services

These are comprised of non-discretionary projects initiated by customers or developers where investment is required to enable customers to connect to Enersource's distribution system. This program includes requests for new connection and upgrade of services for commercial and industrial customers. Commercial development is largely influenced by the state of the local economy and commercial vacancy rates.

Residential Service Upgrades

These are comprised of non-discretionary projects initiated by residential customers where investment is required to enable upgrade of services for these customers.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Complete requirements for customer connections/upgrades as requested**

This alternative ensures compliance with the Distribution System Code ('DSC'). Keeping in line with our customer centric focus, the efficient and timely connection will also ensure customer satisfaction and reflect favourably on our customer service metrics. Given that the number of these projects and their timing is not in Enersource's control, there is the potential for such projects to impact the timing of other planned projects.

OPTION 2: **Defer completion of such projects if needed**

Deferring such projects would enable Enersource to better plan project workflow but would result in non compliance with the DSC and would also negatively impact customer service and Enersource's reputation.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

As Enersource is obligated to connect customers as per the DSC, Option 1 is the preferred solution which also ensures customer satisfaction. These would not be achieved if such projects were to be deferred.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project identified as a result of customer request
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Enersource is obligated to connect/upgrade customers as per the DSC

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Completing such projects within targeted timeframes will ensure no negative impact on the New Connections and appointment times ESQRs
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Connecting customers efficiently and in a timely manner will provide positive customer service impression
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Failure to complete connections on time may negatively impact Enersource's reputation

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u> Not applicable
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u> Not applicable
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u> Not applicable
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u> Not applicable
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> As these projects are initiated by the various customers and developers, the ACA health index is not taken into account. The ACA health index of the affected assets may vary from project to project.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 3 to 6 months Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? Non compliance with the DSC
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? N/A

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 3 - > \$30,000		
	Support: Moving and replacing assets while undertaking connections/upgrades will allow Enersource to avoid ongoing inspection and maintenance work on a short term basis. This work allows Enersource to upgrade its distribution assets and bring it up to the most current standard. This minimizes the risk of near-term failures that would require immediate replacement/repair and it may occur during off hours.			
	One-Time Costs	This project will incur/create one-time costs of: [Redacted]		
	Support: Year	C0541	C0542	C0544
	2016 2017 2018 2019 2020 2021	\$0.8M \$0.8M \$0.8M \$0.8M \$0.8M \$0.8M	\$2.6M \$2.6M \$2.6M \$2.6M \$2.6M \$2.6M	\$0.125M \$0.125M \$0.125M \$0.125M \$0.125M \$0.125M
Ongoing Costs	This project will incur/create ongoing costs of: [Redacted]			
Support: N/A				
Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu		Anticipated Derecognition	
	What type of assets are being replaced? Various - As these projects are commonly for		[Redacted] -	

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Project identified as a result of customer request <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT SHEET	
PROJECT NAME:	New Subdivisions (Offer to Connect)
PROGRAM NAME:	New Subdivisions (Offer to Connect)
BUSINESS UNIT:	C0541
SPONSOR:	PAUL SIDHU
INITIATOR:	PAUL SIDHU
BUSINESS CASE #:	2016 - C0541-C0542-C0544-1

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> Under the terms of the Distribution System Code (DSC), Enersource has an obligation either to connect or to make an “Offer to Connect” to any Customer that is within its service area. Enersource uses the economic evaluation methodology as prescribed by the DSC to determine the amount, if any, of capital contributions for each subdivision projects. These investments are driven by subdivision developers and cannot be deferred. Expenditures related to new subdivision project costs are forecasted using a number of factors which include the following: • Historical levels of activity and investment; • Known developments in the planning stages using City’s zoning information and permit applications; • City of Mississauga plans; and • Review of economic factors; Although the above factors are used as a basis for capital expenditure forecasts, there is a high likelihood that actual expenditures will vary significantly from projections as each of the above driving factors may vary considerably from underlying assumptions made during the capital planning phase. Enersource tracks proposed developments from information provided by the City’s Planning and Building department and uses this information to estimate future loading requirements. The number of concept draft plans and rezoning applications are a good indication of capital expenditures required in future years. Subdivision development is primarily dependent on the local economy. Growth has been steady in this sector over the past few years with townhouses and condominiums dominating the new construction, as the City transitions into a mature urban community through its emphasis on intensification and redevelopment. With the decreasing trend in availability of green space for building new subdivisions, Mississauga is currently undergoing a transformation into a modern urban centre with intensification and redevelopment of existing neighbourhoods, evident from large number of high-rise building construction projects in the downtown core and NW part of Mississauga. As Enersource is obligated to complete such projects as per the DSC, options are limited to carrying out the project vs. deferral to a later date. However, the deferral options is also limited as the DSC stipulates certain timeframes within which a customer should be connected once the request as been made. Therefore, the chosen solution would be to carry out the project once the customer requests connection which is also in line with Enersource's customer centric focus. Project cost: \$0.8M

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> The completion of these projects within targeted timeframes will ensure no negative impact on the New Connections and appointment times ESQRs. Timely and efficient connections will also help meet Enersource' new customer growth targets. While working in the various locations, opportunity may exist to determine the condition of assets in the area and carrying out necessary repairs/replacements thereby mitigating risk of asset failure and cost of emergency repair/replacement.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Industrial / Commercial Services
PROGRAM NAME:	Industrial / Commercial Services
BUSINESS UNIT:	C0542
SPONSOR:	PAUL SIDHU
INITIATOR:	PAUL SIDHU
BUSINESS CASE #:	2016 - C0542-1

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This program is comprised of various non-discretionary projects initiated by industrial/commercial customers or developers where investment is required to enable customers to connect to Enersource's distribution system. Per the Distribution System Code (DSC), Enersource is obligated to carry out these requests for new connections and upgrade of services from commercial and industrial customers. Commercial development is largely influenced by the state of the local economy and commercial vacancy rates. The majority of the commercial development work is occurring in the NW corner of the City. Commercial growth has been slow but steady over the past few years. As Enersource is obligated to complete such projects as per the DSC, options are limited to carrying out the project vs. deferral to a later date. However, the deferral option is also limited as the DSC stipulates certain timeframes within which a customer should be connected once the request has been made. Therefore, the chosen solution is to carry out the project once the customer requests connection which is also in line with Enersource's customer centric focus. Project cost: \$2.6M

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> The completion of these projects within targeted timeframes will ensure no negative impact on the New Connections and appointment times ESQRs. Timely and efficient connections will also help meet Enersource's new customer growth targets. While working in the various locations, opportunity may exist to determine the condition of assets in the area and carrying out necessary repairs/replacements thereby mitigating risk of asset failure and cost of emergency repair/replacement.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Residential Service Upgrades
PROGRAM NAME:	Residential Service Upgrades
BUSINESS UNIT:	C0544
SPONSOR:	PAUL SIDHU
INITIATOR:	PAUL SIDHU
BUSINESS CASE #:	2016 - C0544-1

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This program is comprised of various non-discretionary projects initiated by residential customers where investment is required to enable upgrade of services for these customers. Per the Distribution System Code (DSC), Enersource is obligated to carry out these requests for upgrade of services. The number of these projects and type of work involved can vary e.g. change from overhead to underground service, new service to rebuilt homes etc. As Enersource is obligated to complete such projects as per the DSC, options are limited to carrying out the project vs. deferral to a later date. However, the deferral option is also limited as the DSC stipulates certain timeframes within which a customer should be connected once the request as been made. Therefore, the chosen solution is to carry out the project once the customer requests connection which is also in line with Enersource's customer centric focus. Project cost: \$0.125M

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> The completion of these projects within targeted timeframes will ensure no negative impact on the New Connections and appointment times ESQRs. While working in the various locations, opportunity may exist to determine the condition of assets in the area and carrying out necessary repairs/replacements thereby mitigating risk of asset failure and cost of emergency repair/replacement.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT BUSINESS CASE	
PROJECT NAME:	ROAD PROJECTS
PROGRAM NAME:	2016-2021 ROAD PROJECTS
BUSINESS UNIT:	C0531 - ROAD PROJECTS
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
DEPARTMENTS INVOLVED:	ASSET OPERATIONS, ASSET MANAGEMENT, PURCHASING
DATE SUBMITTED:	FRIDAY, JULY 28, 2015
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0531-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This project covers joint use work that EHM is obligated to provide in order to meet its contractual obligations to the City of Mississauga, Region of Peel, Hydro One and the Ministry of Transportation. This work covers changes/ upgrades to the distribution assets to accommodate the needs of joint use partners. The requests may also result in pole class and height changes to accommodate increases in pole loading and to obtain appropriate ground clearances for public safety.
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

EHM installs the majority of its infrastructure along road right of ways that are owned and managed by the City of Mississauga and the Region of Peel at no cost to the utility. EHM distribution equipment occupies road allowances at no cost and in return is required to remove, relocate or reconstruct its facilities in order to accommodate the specific requirements of the road authorities. Their road works program largely drives plant relocation and is located throughout the City. This work can impact both overhead and underground distribution plant. EHM follows the Public Service Works Highways Act and associated regulations governing the recovery of costs related to road reconstruction work by collecting contributed capital for 50% of labour and labour saving devices. Timelines for the execution of these projects are dictated by Region of Peel, City of Mississauga, or the Ministry of Transportation.

The amount of relocation work is primarily dependent on the economy and on various levels of government funding. The City establishes a road works program for each year but frequent and sudden changes occur which makes it extremely difficult to accurately forecast this project section. The City undertakes a number of projects every year to maintain and expand its infrastructure, but these lists are not typically finalized until the year the work occurs in.

EHM does try to anticipate these requests of possible pending works through participation in meetings with the City and the Region and through review of City site plans and zoning amendments. The expected financial impact on EHM of plant relocation is based on historical levels, previous year project carry-over and discussions with the City.

In 2016, EHM will support the following road projects by relocating electrical plants:

QEW - Hurontario to Mississauga Road
McLaughlin Road Widening - Eglinton to Parkwood
Goreway Overpass
Creditview Bridge Widening
Various Intersections

This work will have a significant impact on manpower and ability to do new capital work.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Complete relocation requirements as requested

This alternative ensures compliance with the Distribution System Code ('DSC').

OPTION 2: Installation of underground feeder cables

This option was evaluated, and because the underground system is approximately 6 to 10 times more expensive than the overhead system, it was determined to be too costly.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Road Projects are mandatory obligation under the DSC, Section 3.4. – Relocation of Plant that requires Enersource to address relocation of its assets when requested by a road authority.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Highway or roadway relocations, and upgrades needed to accommodate municipal, federal or provincial infrastructure improvements
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> EHM is obligated to relocate assets in order to meet its contractual obligations to the City of Mississauga, Regional of Peel, Hydro One, and the Ministry of Transportation.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> These projects are required to maintain existing service while accommodating projects being carried out by the City of Mississauga, Regional of Peel, Hydro One, and/or the Ministry of Transportation.
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Ensures regulatory obligations are met in a timely manner.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Execution of requests to move assets ensures EHM is not held responsible for delaying projects issued by the road authorities.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u>
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> As these projects are initiated by the various road authorities, the ACA health index is not taken into account. As such, the ACA health index of the affected poles may vary from project to project.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year 2016
	What is the impact of deferring or not meeting the specified deadline date? Non-compliance with the DSC and the Public Service Works Highways Act
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? Road projects (e.g. road widening) carried out by the City of Mississauga, Region of Peel and the Ministry of Transportation.

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: 3 - > \$30,000 Support: Moving and replacing overhead distribution assets will allow Enersource to avoiding ongoing inspection (e.g. patrolling feeders) and maintenance work (e.g. insulator washing) on short term basis. This work allows Enersource to upgrade its distribution assets and bring it up to the most current standard. This minimizes the risk of near-term failures that would require immediate replacement/repair and it may occur during off hours.
	One-Time Costs This project will incur/create one-time costs of: \$18M Support: 2016 - \$3M 2017 - \$3M 2018 - \$3M 2019 - \$3M 2020 - \$3M 2021 - \$3M
	Ongoing Costs This project will incur/create ongoing costs of: Support:
	Impact on Distribution Rates / Revenue Requirement What is the age of the assets being replaced? 20 years What type of assets are being replaced? overhead lines, poles, switches, transformers
	Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$18M <i>Variance:</i> #VALUE! <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Highway or roadway relocations, and upgrades needed to accommodate municipal, federal or provincial infrastructure improvements <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT SHEET	
PROJECT NAME:	QEW - Hurontario to Mississauga Road
PROGRAM NAME:	2016 ROAD PROJECTS
BUSINESS UNIT:	C0531 - ROAD PROJECTS
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0531-1

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This project involves the relocation of 50 poles carrying four circuits running parallel to the QEW between Hurontario Street and Mississauga Road to accommodate the widening of the QEW (one additional lane in each direction) Project budget: \$1.5M

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This is a mandatory project that will require relocation of poles and overhead assets to ensure timely widening of the QEW to accommodate new lanes on both sides of the highway.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	MCLAUGHLIN ROAD WIDENING - EGLINTON TO PARKWOOD
PROGRAM NAME:	2016 ROAD PROJECTS
BUSINESS UNIT:	C0531 - ROAD PROJECTS
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0531-2

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of this project is to widen the road on both sides of McLaughlin Road from Eglinton to Parkwood to accommodate for on-street bicycle lanes, repair any deficiencies and overlay the entire roadway. To minimize the impact to the existing infrastructure the road was widened symmetrically and lane widths were kept to a minimum. However, a couple of poles are impacted and will need to be relocated, including both the streetlight and distribution poles that will definitely need relocating. In addition, the existing poles will be upgraded to concrete poles in the future. Project budget: \$0.6M

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This is a mandatory project that will require relocation of poles and overhead assets to ensure timely widening of McLaughlin Road to accommodate new bicycle lanes on both sides of the road.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Goreway Overpass
PROGRAM NAME:	2016 ROAD PROJECTS
BUSINESS UNIT:	C0531 - ROAD PROJECTS
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0531-3

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of this project is to relocate 10 poles carrying three circuits to accommodate a road project that will create an overpass over existing rail tracks crossing Goreway Drive. Goreway currently cross rail tracks between Mississauga and Brampton. This project includes temporarily relocating the existing pole line to accommodate construction of a new overpass on Goreway. Once the overpass has been built, the temporary pole line will be relocated to its final location above grade. Project budget: \$0.3M

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This is a mandatory project that will require relocation of poles and overhead assets to ensure timely construction of an overpass over Goreway Drive.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Creditview Bridge Widening
PROGRAM NAME:	2016 ROAD PROJECTS
BUSINESS UNIT:	C0531 - ROAD PROJECTS
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0531-4

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of this project involves the relocation and removal of 10 poles carrying three circuits to accommodate the widening of Creditview Road over the Creditview river, from two lanes to four. Currently the pole line runs parallel to the bridge on the west side. The new wider bridge encroaches on the usable land for new pole locations making it more economically viable to have the circuits relocated in duct within the new bridge. Project budget: \$0.3M

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This is a mandatory project that will require relocation of poles and overhead assets to ensure timely construction of bridge widening over the Creditview river along Creditview Road.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Various Intersections
PROGRAM NAME:	2016 ROAD PROJECTS
BUSINESS UNIT:	C0531 - ROAD PROJECTS
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0531-5

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of these projects is to accommodate small road projects put forth by the city and typically involves the relocation of one to two poles, their associated guying, circuits, and other installed equipment. Projects may include: - the installation of right hand and left hand turning lanes - city sidewalk refurbishments and relocations Project budget: \$0.3M

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> These are mandatory projects that will require relocation of poles and overhead assets to ensure timely construction of bridge widening over the Creditview river along Creditview Road.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT BUSINESS CASE	
PROJECT NAME:	Retrofit and New Installation of Individually Metered Suite Meering
PROGRAM NAME:	
BUSINESS UNIT:	C0899 - SMART METERING IN NEW CONDO
SPONSOR:	Doug Morrison
INITIATOR:	David Rankin
DEPARTMENTS INVOLVED:	Metering, Settlement, Billing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0899-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Under government of Ontario rules, suite metering is allowed in existing buildings/condos where certain prescribed conditions are met. In the case, under the regulation, in new build construction all suites must be individually metered. Enersource provides unit suite metering to both new and existing condos in Mississauga.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Contract out Individual metered services**

OPTION 2: **Perform all work with EHM staff**

OPTION 3: **Use a combination of EHM Staff and contractors for installations and a licensed third party for commissioning services and Measurement Canada inspections.**

The third option was accepted as it supports the Ontario initiative and allows Enersource to maintain appropriate controls and effectively provide the service at a reasonable cost while ensuring compliance to Measurement Canada metering requirements.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

The third option was accepted as it supports the Ontario initiative and allows Enersource to maintain appropriate controls and effectively provide the service at a reasonable cost while ensuring compliance to Measurement Canada metering requirements.

Enersource partnered with Golden Horseshoe Metering Systems to provide Unit suite Metering services in Mississauga. Enersource staff perform metering installations in new build construction, with GHMS performing commissioning of the services and a third Party licensed provider performing the Measurement Canada SE-04 Inspections.

For retrofit buildings (existing condominiums/rental apartment buildings etc.) GHMS provide a turn-key solution for conversion, with the same third party licensed entity providing the Se-04 inspections.

PROGRAM	Budget
- Installation of Suite Metering in New Condominiums	\$1,023,000
- Installation of Suite Metering in existing Condominiums /Apartments	\$ 364,000

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Contracted timelines for the occupancy of new build condos and conversion of existing bulk metered buildings to individual metered units require timely completion of the equipment installation.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> New service installation timelines are met.
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Maintains positive relationship with developers for new build construction ensuring repeat requests. Positive customer experience for Property manager charged with maintaining or reducing electricity costs for condominiums.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk <u>Support:</u> A late completion could impact EHM's industry reputation and result in lost revenue/future installation work to sub-meter providers.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? 3 to 6 months
	And/or enter specific deadline/implementation date: Q2 2016
	What is the impact of deferring or not meeting the specified deadline date? OEB Sanctions due to non-compliance. Reputation impact due to lost revenue.
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: Select from drop-down menu	
	One-Time Costs <u>Support:</u> New IMS: \$1,023,000 Retrofit IMS: \$364,000	This project will incur/create one-time costs of: \$1,387,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Select from drop-down menu</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,387,000 <i>Variance:</i> <u>(\$1,387,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Project required to become or remain compliant with applicable legislation and/or regulation <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Large Commercial Interval Meter Replacement Project
PROGRAM NAME:	
BUSINESS UNIT:	C0594 - SMART METERS LARGE USERS
SPONSOR:	Doug Morrison
INITIATOR:	David Rankin
DEPARTMENTS INVOLVED:	Metering, Billing, Collections, Settlements
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0594-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> The OEB Mandated replacement of Large Commercial Mechanical metering with Interval or Smart Meters in its decision EB-2013-0311 released May 21, 2014. Enersource had approximately 1,800 meters impacted by this decision and decided to complete the replacement over a two-year period (2015-2016) in order to gain the efficiencies of remote data collection. Benefits of this change include eliminating the cost of manually reading these meters on a monthly basis, improved accuracy, removing human error from the process by remotely reading the meters through existing Advanced Metering Infrastructure ("AMI"). Cost avoidance by using the existing communication capability to backhaul the usage data to the EHM billing systems. As part of this addition new data elements are being introduced to enable interval based billing for these accounts. In order to achieve the mandate, it is necessary to upgrade the existing AMI's software version to Version 9.0 in order to collect the additional data and bill the customer accurately. The increased cost to backhaul this additional data will be marginally offset by a reduction in the cost of the number of Collector (Gatekeeper) locations. In addition, the early versions of the collector meters or Gatekeepers cannot support the additional data and will need to be upgraded to the newer versions as well. This will be covered in a separate business case detailing the cost and benefits of this change.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

- Large Commercial Mechanical meter replacements with MIST interval meters pursuant to OEB Decision EB-2013-0311 Released May 21, 2014; Enersource plans to complete the conversion to smart interval metering for Large Commercial services by the end of 2016. (900 – 2015, 900 – 2016)
- The last class of customers with a significant amount of mechanical meters is the large commercial/industrial group greater than 50 kW. In May 2014, the OEB mandated LDCs to replace mechanical meters with meters capable of providing hourly interval data for billing purposes and, at the discretion of the LDC, using the existing Advanced Metering Infrastructure (“AMI”) communication capability to backhaul the usage data to their billing systems. The OEB directed that all replacements be completed by 2020.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Installing Interval Meters w Telephone lines

The ongoing cost of maintaining "wired" phone lines and monthly data backhaul was deemed too expensive compared to using the existing backhaul infrastructure and would have been an unnecessary incremental expense. Taking advantage of the existing communication infrastructure allows Enersource to maintain a low cost-base for communication with the metering equipment.

OPTION 2: Installing Smart Meters using existing communication infrastructure

The existing communication infrastructure allows Enersource to take advantage of very competitive rates for data backhaul. The low level of issues encountered using the wireless service improves efficiency of billing by supplying accurate data with regularity and reliability. EHM currently reads the existing meter population at greater than 99% daily. Adding the large commercial metering to the existing infrastructure will result in minor increases in cost due to the additional data volume.

OPTION 3: Installing Smart Meters using existing communication infrastructure- Resourced by EHM and Contractor

The volume of meter exchanges coupled with regular workload presents a significant challenge for EHM to complete the project within a reasonable timeframe. In order to bring the project to completion and reap the benefits of the expanded communication infrastructure, EHM proposes using a combination of EHM staff and contract installation crews to complete the work at a comparable cost.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Using smart meters to accomplish this directive takes advantage of existing metering technology and helps maintain the existing standard on metering equipment, thereby making maintenance and repair easier and eliminating the cost of carrying multiple meter manufacturers for the same service sizes. Cost that would have been associated with installing and maintaining wired telephone lines are eliminated. The smart meters can be remotely read using the same technology that reads the Residential and Small commercial meters to backhaul usage data to the EHM billing system. This approach stabilizes costs for communication and eliminates keying errors thereby providing more timely and accurate bills to customers.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Required - Deferral of project not recommended and will impact the schedule for multi-year programs.
	<u>Support:</u> The project can be accomplished within the Enersource timeline or 2015-2016, thereby realizing the efficiencies and performance improvements as soon as possible. This directly impacts the ability of Enersource to bill customers in a more efficient and accurate manner, contributing to Enersource's achievement of OEB billing accuracy targets.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u>
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u>
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: September-01-15
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years December-01-16
	What is the impact of deferring or not meeting the specified deadline date? Impacts include ongoing manual meter reading costs. Delay in benefitting from new meter functionality. Window for completion is 2014 - 2020 no impact on OEB timing or compliance.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies		
	This project will save or avoid operational costs of: 10 - > \$100,000		
	<u>Support:</u> Meter reading costs average \$200K per year. Completion of the project will eliminate this cost. Occasional meter reads and re-reads will be performed by existing staff post-implementation.		
	One-Time Costs		
	This project will incur/create one-time costs of: \$1,775,522 <u>Support:</u> Labour and Material costs. 2015 forecast spend = \$838,575; 2016 = 936,947.		
	Ongoing Costs		
	This project will incur/create ongoing costs of: \$3,600 <u>Support:</u> Additional data download costs estimated at \$300 per month.		
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 20 years	Anticipated Derecognition \$416,392
		What type of assets are being replaced? Meters/ Collectors	

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 10 - > \$100,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,775,522 <i>Variance:</i> <u>(\$1,775,522)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$3,600 <i>Variance:</i> <u>(\$3,600)</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> \$416,392 <i>Variance:</i> <u>(\$416,392)</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Project required to become or remain compliant with applicable legislation and/or regulation <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Enhancements to AMI Systems – Replacement of version 4.0 Gatekeepers
PROGRAM NAME:	
BUSINESS UNIT:	C0594 - SMART METERS LARGE USERS
SPONSOR:	John Bonadie, Ramez Hakeem
INITIATOR:	Ramez Hakeem
DEPARTMENTS INVOLVED:	Metering, Finance
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0594-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This project is required to enhance business functionalities of the AMI (Advanced Metering Infrastructure) systems as broken out below: 1. EHM has a total of 622 collectors (Gatekeepers) that will need to be replaced or removed in order to provide hourly interval billing for Enersource's Large Commercial customers as directed by the OEB. 2. Of the 622 collectors, 300 are operating on version 4.0 firmware. Having these collectors in the field negatively impacts the operation of our smart metering network and data collection activities. These collectors have been identified as non-updatable and the manufacturer has recommended their replacement with newer technology. 3. 68 Commercial Collectors and 554 Residential (Single Phase) Collectors are currently active in Enersource's service area.
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

EHM has approximately 300 out of 622 collectors in the field which are on the earliest firmware version (4.0). These collectors have been identified to slow down the system performance and data collection due to their limitation and lack of full compatibility with newer AMI technology. It is proposed to replace these collectors with up to date meters that will improve the communication speeds and ultimately allow hourly interval billing for large commercial metered accounts. It is also recommended that the remaining 322 collectors be retired from service as the coverage provided by the newer meters will be sufficient to collect the same amount of data. This will effectively eliminate the impact of the older technology and improve the speed with which the data is retrieved.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Status quo**

Would only be viable until the end of the six-year window for full deployment and hourly interval billing under the OEB mandate. At the end of the window, it would be necessary to have all large commercial customers billing on hourly interval data in order for Enersource to be compliant with the OEB directive. A deployment time frame to coincide with the end of the deployment of the Hourly Interval Meters would be prudent and would provide a transition period to allow for gradual conversion to Hourly Interval Billing, while providing improved performance to accommodate the additional data being backhauled.

OPTION 2: **Replace the existing Collectors (Gatekeepers) with newer high capacity collectors (Gatekeepers)**

In order to use the hourly interval data to bill large commercial customers, the collectors that are currently in the field will need to be replaced/removed. The current firmware and memory constraints would not allow the collection of the volume of data that a large commercial meter would generate for interval billing. More than half of the existing collectors were installed in the early days of the Smart Meter Initiative and cannot be upgraded. The new collectors can handle the increased volume generated by the commercial interval meters and have enough memory to report up to 1200 residential meters usage. Large commercial interval meters generate four times as much data as a regular residential meter. The existing collectors are not capable of handling the multiple channels of data generated by the large commercial interval meters, while the new collectors manage the different channels of data from the large commercial meters due to the improved design and memory.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

The project is to replace 350 Collectors (Gatekeepers) with the newer technology and to remove the remaining collectors (272) from service. A de-recognition of the existing 622 meters would be required. The higher capacity memory and newer firmware of the 350 new collectors will be enough to cover the requirements of the city. This will marginally reduce the data collection cost as the per point costs will be reduced from 622 to 350.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Required - Deferral of project not recommended and will impact the schedule for multi-year programs.
	<u>Support:</u> The benefits of this project would include: 1. A reduction/elimination of manual meter reading costs for General Services accounts (Reduced/Eliminated costs) 2. Fewer retries due to lost communication (Lower communication Costs) 3. Call-in on failure function would be available (In support of the Outage Management System) 4. Faster data collection times (lower data communication costs) 5. Fewer Collectors, Modems and enclosures to maintain and manage (Lower data communication Costs)

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Currently GS>50 are read manually, and when reads are not available then estimation is used for billing purposes. Having all GS read through AMI network will result in more accurate meter reading and thus reduction in "Estimated" bills
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Currently GS>50 are read manually, and when reads are not available then estimation is used for billing purposes. Having all GS read through AMI network will result in more accurate meter reading and thus reduction in "Estimated" bills
	Reputational Risk Does this project reduce or eliminate a reputational risk? Select from drop-down menu <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: 8 - ACA health index "Poor"
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: February-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year December 2016
	What is the impact of deferring or not meeting the specified deadline date? Little to no impact of EHM imposed deadline as the OEB deadline is 2020 to support Interval billing of large commercial customers.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Yes, The Large Commercial Meter Replacement project requires this to be fully compliant with the OEB directive.

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount
	<u>Support:</u> While there will be a light reduction in costs due to the reduction of the number of SIM cards required, the volume of data will increase due to the addition of the new large commercial meter points.	
	One-Time Costs	This project will incur/create one-time costs of: \$568,564
	<u>Support:</u> Cost associated with the purchase of ~350 new gatekeepers (Collector meters).	
	Ongoing Costs	This project will incur/create ongoing costs of: [Redacted]
	<u>Support:</u> No increase in ongoing costs.	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 7 years
		What type of assets are being replaced? Metering
		Anticipated Derecognition [Redacted] -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

- Maintaining and utilizing newer technology will mitigate the risk of slow AMI network performance and or downtime.
- New collectors will also allow us to utilize full TCP/IP solution between collectors and data collection centre. Currently additional components are needed to convert communication signals
- Meter Reading safety risks eliminated

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$568,564</u> <i>Variance:</i> <u>(\$568,564)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project required to become or remain compliant with applicable legislation and/or regulation</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - ACA health index "Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Wholesale Meter TCP/IP Communication Implementation 2015
PROGRAM NAME:	
BUSINESS UNIT:	C0597 - WHOLESALE METER UPGRADES
SPONSOR:	John Bonadie, Doug Morrison
INITIATOR:	David Rankin
DEPARTMENTS INVOLVED:	Metering, Settlements
DATE SUBMITTED:	September-22-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0597-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> In 2015 we changed out 12 meter reseals and converted 12 meter points to TCP/IP, first to ensure IESO compliance and in order to eliminate communications issues and also reduce monthly ongoing costs. TCP/IP internet communications provide proven reliable connections for TS meter readings. As other work occurs at TS's such as re-seals, upgrades, and cabinet replacements, we take the opportunity to convert to TCP/IP at the same time thereby saving costs. In 2016, we are proposing to reseat 24 meter points and also proposing to install this communication method where required for update. As of January 2016, the IESO will require any new meter point to have TCP/IP and any changed/alterd meter point by July 2016 (this includes meter changes). TCP/IP will eliminate maintenance calls and administration work both for EHM and Rodan. We anticipate for these three sites TCP/IP installation will carry a one-time costs of \$62,229 for modems and related equipment as well as identified benefits of \$4,838 (other savings such as EHM staff time not quantified).	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

- Opportunity to install 10 TCP/IP modems with these meter changes thereby improve existing communications.
- Eliminate Bell land line charges.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Replace with TCP/IP which will also provide better communication reliability

OPTION 2: Leave existing Bell land lines; more expensive, less reliable

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

- Install proven TCP/IP Internet based communications, currently used at 23 meter points (plus 12 more conversions in 2015)
- During 2016, proposed conversions will take place at Bramalea, Cooksville, Erindale, Meadowvale, Oakville and remaining feeds at Woodbridge

BENEFITS

- Provides a cheap communications method in comparison to existing land lines.
- Long-term cost reduction by eliminating potential Rodan service calls
- Eliminate Bell land line monthly charges. Our monthly TCP/IP data costs will only be about 27% of communication costs we are paying currently.
- Eliminate other potential costs below not quantified in Financial Summary;
 - o Administration of Meter trouble calls, , Metering Services Coordinator
 - o Support at Transformer Station during Rodan service calls, EHM Meter Techs
 - o Re-solving meter reading discrepancies, Wholesale Settlement Analyst
 - o Issuing NOD's re bad readings, Wholesale Settlement Analyst
 - o Reconciling IESO invoice charges re bad readings, Wholesale Settlement Analyst

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Meter seal expiry is a Measurement Canada regulation and must be adhered to in order to avoid sanction or fines.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 3 - May mitigate brand risk <u>Support:</u> Meter seal expiry is a Measurement Canada regulation and must be adhered to in order to avoid sanction or fines. Such sanctions could negatively impacts EHM industry reputation.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
<u>Support:</u>		
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu
	<u>Support:</u> Comments...	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes	
	Anticipated start date: January-01-16	
	Urgency of implementation? 6 month to 1 year	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Risk of becoming non-compliant with Measurement Canada metering guidelines. Risk of becoming non-compliant with IESO reporting timelines and settlement of account.	
	What level of uncertainty is associated to implementation (unknowns or variables)? Low	
	Do other projects rely on this project being completed? No	

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 3 - > \$30,000						
	Support: • Savings of \$4,838 over five years even before other un-quantified savings listed below would be taken into account. • Eliminate other potential costs not quantified in Financial Summary above; - o Administration of Meter trouble calls, , Metering Services Coordinator - o Support at Transformer Station during Rodan service calls, EHM Meter Techs - o Re-solving meter reading discrepancies, Billing Data Quality Analyst - o Issuing NOD's re bad readings, Wholesale Settlement Analyst - o Reconciling IESO invoice charges re bad readings, Wholesale Settlement Analyst The project is mandatory to ensure compliance with IESO Market Rules, and therefore meters with expired seals must be replaced. These costs are capital in nature and will be capitalized in to fixed assets. Note savings from discontinuing the bell lines are projected at \$4,838 over five years. However, the payback period will extend over a much longer time than the evaluation period given the greater capital expenditure required to meet the IESO requirement.							
	One-Time Costs	This project will incur/create one-time costs of: \$163,320						
	Ongoing Costs	This project will incur/create ongoing costs of: []						
	Impact on Distribution Rates / Revenue Requirement	<table> <tr> <td>What is the age of the assets being replaced?</td> <td>6 years</td> <td>Anticipated Derecognition</td> </tr> <tr> <td>What type of assets are being replaced?</td> <td>Grid Supply Point Meters</td> <td>-</td> </tr> </table>	What is the age of the assets being replaced?	6 years	Anticipated Derecognition	What type of assets are being replaced?	Grid Supply Point Meters	-
What is the age of the assets being replaced?	6 years	Anticipated Derecognition						
What type of assets are being replaced?	Grid Supply Point Meters	-						

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$163,320 <i>Variance:</i> <u>(\$163,320)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Project required to become or remain compliant with applicable legislation and/or regulation <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - May mitigate brand risk <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Wholesale Meter Upgrades – Tomken Station
PROGRAM NAME:	Wholesale Meters
BUSINESS UNIT:	C0597 - WHOLESALE METER UPGRADES
SPONSOR:	John Bonadie
INITIATOR:	Ramez Hakeem/Natalie Yeates
DEPARTMENTS INVOLVED:	Revenue, Settlements, Metering
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0597-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
X	System Access
	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).	
If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Tomken station has wholesale metering equipment which is market compliant. However, the metering equipment is not in an enclosure. Due to this reason, the station is not fully compliant with the wholesale market rules. EHM's MSP provided 4 options to review with HONI regarding their plans for the station and the feasibility of the 4 options. HONI informed EHM that they plan on replacing the PCT building in spring 2016. This leaves EHM with only one viable option which is to move to bus metering with full upgrade on the 44KV buses. The existing HONI owned VTs are also being used by Enersource and will need to be replaced.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:	<i>Additional security measures necessary to allow the meters to remain rack-mounted within the relay building</i>
OPTION 2:	<i>Relocating the meters to a meter enclosure within the relay building</i>
OPTION 3:	<i>Relocating the meters from inside to outside the relay building within one or two meter enclosures</i>
OPTION 4:	<i>Abandoning the existing bus metering and installing feeder metering outside the TS</i>
OPTION 5:	<i>Move to bus metering with full upgrade on the 44KV bus</i>

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

For security and liability reasons, Hydro One will not allow Options 1 or 2. Hydro One requires customer metering cabinets to be located outside the relay building and outside the operating area of the station. The relay buildings are locked and access to the customer's metering cabinets must not require HONI's assistance. For these reasons, only Options 3 and 4 are acceptable to Hydro One.

Option 3 is no longer a valid option since EHM learned about HONI's 2016 plan for the station. Option 4 is not acceptable because the cost to EHM is high since we will need to have a metering point at each feeder in the station. There are 14 feeders at Tomken having this many metering points increases our MSP monthly costs, communication costs, and ongoing metering maintenance i.e. verifications, etc

HONI informed EHM that they plan on replacing the VT building in spring 2016. Assessing the options above, leaves EHM with only one viable option which is to move to bus metering with full upgrade on the 44KV bus.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project identified as a result of customer request
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Alignment with HONI rebuild allows replacement with little to no impacts on customer.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR
	<u>Support:</u>	
	Customer Satisfaction	Does this project add Customer Value? 0 - No impact on Customer Service
	<u>Support:</u>	
	Reputational Risk	Does this project reduce or eliminate a reputational risk? 0 - No brand impact
	<u>Support:</u>	

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 0 - No impact on customer minutes of outage
	<u>Support:</u>	
	System Expansion	This project increases system capacity: 0 - No Impact on system capacity
	<u>Support:</u>	
	System Renewal	This project is for replacement of distribution assets where: Select from drop-down menu
	<u>Support:</u> HONI has requested existing metering to be installed in cabinets outside the VT building.	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: November-01-15
	Urgency of implementation? 3 to 6 months
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? An outage would be required at the station to allow EHM to replace/Move the existing equipment into stainless steel cabinets outside of the VT Building.
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$1,100,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: 	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu	What type of assets are being replaced? Metering, CTs, PTs

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>0 - No significant amount</i> <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$1,100,000</u> <i>Variance:</i> <u>(\$1,100,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> <i>Project identified as a result of customer request</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Select from drop-down menu <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	2016-2021 OVERHEAD REBUILDS
PROGRAM NAME:	OVERHEAD REBUILDS
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	August-28-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0561-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Pole lines deteriorate over time, and when their strength is reduced to the point that there is a risk of failure under adverse weather conditions, they are deemed to be at the "end of useful life". During 2014-2015 period, Enersource inspected all its distribution poles. During the inspection, a number of poles were found to be in the "poor" condition, which included rotting, mechanical damage, evidence of insects and pole cracking. In addition, the field inspections have identified a number of transformers with PCB greater than 2ppm installed on these poles and/or showing evidence of leaking. The overhead transformers with PCB will be removed in order to reduce the risk of environmental spill and/or soil contamination. Moreover, the projects were chosen to maintain reliable supply of power to the large and critical customers (e.g. airport, hospitals etc.). The projects were also selected to ensure that poles that were reaching end of its life cycle are being replaced. In addition, the insulators will be changed to polymer style, which will reduce the risk of pole fires. Furthermore the pole line will be upgraded to current design and construction standards, in turn making it safer, more reliable and less susceptible to adverse weather conditions.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Overhead pole lines are a critical component of the distribution system and they must be replaced prior to failure. A pole line that is at the end of its expected life needs to be rebuilt to prevent any safety hazards to general public or Enersource's employees that may arise from pole line failure. Planned replacement of pole line costs much less than "emergency" or reactive replacements and are less disruptive to customers. Replacement of these poles lines will also ensure that PCB transformers are replaced thereby minimizing the environmental risk or impact.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Operate with the current overhead pole line

With this option, the pole line would eventually fail and would have to be repaired under emergency conditions, which is not economical when compared to scheduled construction. In addition, there is a great risk that a pole line failure could result in an unsafe situation or damages to private property, general public and critical customers. Some of the transformers contain PCB's so a pole line failure could also result in environmental spill and possibly soil contamination.

OPTION 2: Installation of underground feeder cables

This option was evaluated, and because the underground system is approximately 6 to 10 times more expensive than the overhead system, it was determined to be too costly.

OPTION 3: Undertake replacement of overhead distribution assets

The replacement of overhead assets that were found to be reaching the end of their useful life and pose a safety hazard to general public and Enersource's employees. This allows Enersource to replace these aged assets in a planned manner and avoid emergency/reactive replacements. In addition, removing PCB transformers from the field ensures that Enersource continues removing hazardous material and thereby minimizing the environmental risk.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Rebuilding the overhead pole line was chosen to be the most optimal and cost-effective solution that ensures that impact on the reliability, environment, safety and critical customers is minimized. An option of operating with existing overhead pole lines poses a major risk due to higher likelihood of failure as these assets are reaching end of its life. In addition, the installation of underground feeder cables was deemed to be cost prohibitive.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u> Although replacing aged assets is part of Enersource's asset management plan, these projects are not mandated.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> Replacing aging overhead equipment that minimizes the impact to the reliability, environment, customers and safety and thus leads to the improvement in ESQRs.
	Customer Satisfaction Does this project add Customer Value? 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> Replacing aging overhead equipment ensures reliable supply of power that customers expect.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 10 - Prevents or significantly reduces likelihood of irreparable brand damage <u>Support:</u> By executing these projects, the risk of personal injury and environmental damage is being reduced and would not have a negative impact on Enersource's reputation.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 10 - Potential loss of life <u>Support:</u> Critical failure of the overhead system resulting in poles or equipment coming down carries a potential risk of loss of life or critical injury to general public and Enersource employees.
	Environmental Impact/risk This projects mitigates exposure that could cause: 8 - High environmental impact <u>Support:</u> Number of transformers with PCB greater than 2ppm installed on these poles and/or showing evidence of leaking. The overhead transformers with PCB will be removed in order to reduce the risk of environmental spill and/or soil contamination.
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> The overhead pole lines feed large number of residential, commercial and industrial customers which, in case of a failure, would result in a significant impact to our reliability metrics. In 2014, Enersource has identified over 170 animal contacts resulting in sustained outages and close to 350,000 customer minutes. In addition, in 2014, Enersource had over 50 sustained outages due to overhead equipment failures (e.g. poles, cut-outs, insulators) resulting in over 740,000 customer minutes. The proposed projects for 2016 focus on replacing equipment that have a higher risk of failure.
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> These projects will ensure replacement of aged assets to support existing service capacity.
	System Renewal This project is for replacement of distribution assets where: 8 - ACA health index "Poor" <u>Support:</u> The overhead poles were found to be in deteriorating condition through field inspections. In addition, the asset condition assessment has confirmed that 3% of wooden poles (approximately 400 poles) were found to be in poor or very poor condition. The replacement of these aged poles will allow Enersource to renew these overhead distribution lines and bring it to the most up to date standard.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? 1 year to 3 years And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Higher risk of equipment failure, including poles and overhead equipment failing, thereby resulting in potential public injury or loss of life.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 10 - > \$100,000
	Support: Planned replacement of pole line costs much less than “emergency” or reactive replacements and are less disruptive to customers.	
	One-Time Costs	This project will incur/create one-time costs of: \$39.6M
	Support: 2016 - \$6.09M 2017 - \$6.36M 2018 - \$6.27 2019 - \$6.81M 2020 - \$6.45M 2021 - \$7.62M	
	Ongoing Costs	This project will incur/create ongoing costs of:
	Support:	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 40 years What type of assets are being replaced? Poles and associated equipment
		Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 10 - > \$100,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$39.6M <i>Variance:</i> #VALUE! <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevents or significantly reduces likelihood of irreparable brand damage <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Potential loss of life <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - High environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - ACA health index "Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT SHEET	
PROJECT NAME:	2016 OVERHEAD SWITCH REPLACEMENT PROGRAM
PROGRAM NAME:	OVERHEAD SWITCH REPLACEMENT PROGRAM
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	BRANKO BORAS
BUSINESS CASE #:	2016-C0561-1

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This program is needed to ensure that the replacement of inoperable and end of life equipment such as overhead switches, cutouts and insulators is completed on an annual basis. This program funds the spot replacement of overhead switching equipment over various parts of the City that have been determined to be at the end of life. Project Budget: \$300,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Switches are one of the key components of the power system. They are used to reconfigure an electrical circuit by interrupting the current flow, or to isolate conductors. In addition, fused switches are used to protect transformers and underground conductors under fault conditions. Enersource utilizes four types of overhead switches: • loadbreak switches (load interrupter); • remotely controlled switches; • in-line switches; and • fused cutouts. The overhead distribution system has approximately 570 gang operated, three-phase load break switches and over 1,900 in-line solid blade switches, cutouts and other components. In most cases when a failure of an overhead switch occurs, it is caused by contamination of the insulator, which can lead to a flashover and possibly further degradation of the insulating medium. Sometimes contamination will cause leakage current to develop across the insulator, or other parts of the switch that are not meant to carry current. As a result, these parts may overheat and cause the switch to fail. Also, the loadbreak switches have mechanisms that suppress the arc when the switch contacts are opening, which sometimes fail, causing arcing and damage to the switch contacts. In addition, when overhead switches are not operated over a long period of time, the switch contacts seize, preventing the crew from operating the switch.

System impact from a failure of an overhead switch can be very significant, as typically they would be installed on the overhead main feeders that may supply multiple substations or subtransmission feeders. Failure of an overhead switch installed near Hydro One's transformer station may directly disturb power to several thousand customers, including large commercial and industrial customers.

To ensure that switches on the system are in proper working condition, all switching equipment is inspected with an infrared camera each year for arcing and overheating. During switching operation or as a follow-up to trouble calls, a number of overhead switches were found to be beyond repair and required replacement. In addition, Enersource continues the program of replacing equipment with porcelain insulating components such as cutouts, standoff insulators, and mid-span openers that have proven to be susceptible to failure with new style equipment containing polymer insulators.

The inspection and maintenance performed annually in the load break switch maintenance program identifies a number of switches beyond economic repair that require replacement.

Enersource carries out both proactive and reactive replacement programs of overhead switches in its distribution system.

Enersource has developed a proactive replacement program for replacing overhead switches with deteriorating condition as identified through field inspections. A type of polymer switch were identified as an area of concern due to its likelihood of premature failure, confirmed through field failures and testing analysis completed by the manufacturer. As a result, Enersource has created a program to replace these faulty switches. This will mitigate the risk of extended customer outages associated with the reactive replacement of defective switches and reduce the safety risk to employees and the public. A sample area with these switches identified through the overhead inspection program is shown in Appendix below.

OPTIONS CONSIDERED:

Switch replacement can be temporarily delayed depending on the number of customers that could be affected by the switch breaking but ultimately need replacement. Sometimes replacement is delayed if the area is destined for a complete overhead rebuild or there will be another project like a road widening coming up. In these cases the switch is removed from service or bypassed.

Depending on how badly they are tracking, insulator replacement can also be delayed but ultimately will fail.

The impact of deferral would be an increase in the risk of equipment failure under adverse conditions, leading to reduced reliability and safety hazards to the public and EHM personnel.

Over the long term there is a strong business need to replace this equipment in a proactive manner.

SOLUTION PROPOSED:

Deteriorated or damage switches or insulators need to be changed as they are found because they support the overhead electrical distribution system and providing reliable power to customers. The more circuits on the pole the more likelihood of needed rapid replacement due to the large amount of customers that would be connected to the circuits they service.

The replacement of overhead switches at the end of their useful life will provide following benefits:

1. Eliminate safety hazards to the public and utility personnel
2. Maintain customer reliability with reduced outage duration and frequency
3. Replace end of life assets
4. Improve reliability, power quality and safe operation of the distribution lines facilities.





PROJECT SHEET	
PROJECT NAME:	2016 INSULATOR REPLACEMENT PROGRAM
PROGRAM NAME:	INSULATOR REPLACEMENT PROGRAM
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	BRANKO BORAS
BUSINESS CASE #:	2016-C0561-2

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The system impact from the failure of an overhead insulator is very significant, as it could support the overhead main feeders that may supply multiple substations or subtransmission feeders. The failure of an overhead insulator installed near a transformer station may directly disturb power to several thousand customers, including large commercial and industrial customers. Through the pole and infrared inspection programs, the locations of porcelain and EPAC insulators are being identified, (an example shown in Appendix below). The key locations will be prioritized and these insulators will be replaced with more reliable and safer silicone insulators. Approximately 1,000-2,000 insulators will be replaced each year for the next ten years. Project Budget: \$300,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> When porcelain insulators track, they may heat up to a point where they may shear, posing a safety hazard to the general public or Enersource personnel working near the defective insulator. In the past few years, a number of outages on the overhead system was caused by porcelain or EPAC insulator tracking or breaking. These outages ranged from intermittent power interruptions to a few hundred customers, to sustained outages that affected several thousands of customers. In some cases, porcelain insulator tracking caused pole fires which resulted in prolonged outages and caused damage to other distribution equipment. During a freezing rain storm in March 2015, there were 25 pole fires in one night caused by insulator tracking from road salt. This replacement program is needed annually to replace old porcelain or EPAC insulators that are in high risk areas, where their failure would affect critical customers or greatly impact reliability. A program of upgrading insulators in high contamination areas and replacing specific types of insulators prone to early failure will reduce intermittent and sustained outages.

OPTIONS CONSIDERED: Delay replacing porcelain insulators vs proactive replacement

If replacement is delayed, the insulators may track or fail and cause outages which will impact reliability. In addition they would have to be replaced under emergency conditions, which is not economical when compared to scheduled construction. Finally, there is a risk that an insulator could fail and pose a safety hazard to the general public.

SOLUTION PROPOSED:

Identify porcelain and EPAC insulators, prioritize the replacement based on criticality and risk and replace a number of the insulators each year.

Not proceeding with this project would result in an increase in the risk of equipment failure, leading to reduced reliability and safety hazards to the public and Enersource personnel.

BENEFITS

- Eliminate safety hazards to the public and utility personnel
- Replace end of life assets
- Improve reliability by reducing outages from tree and animal contacts

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Porcelain and EPAC insulator locations





PROJECT SHEET	
PROJECT NAME:	2016 STORES SMALL CAPITAL MATERIAL
PROGRAM NAME:	STORES SMALL CAPITAL MATERIAL
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	BRANKO BORAS
BUSINESS CASE #:	2016-C0561-3

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The Stores Capital Budget is a free shelf material for construction of the distribution system. The material includes bolts, washers, nuts, labels, grounding wires and copper and aluminum wires up to 556 kcmil. The items are not individually expensive but they are used daily in high volume. Some of the expensive items are wires for use in short chunks for transformers, grounding etc. Project Budget: \$400,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> These materials are put in shelves and allow field crews to book them out as needed. As mentioned above, these materials are small equipment parts, consisting of hardware such as nuts, bolts, washers, labels. Larger items are copper and aluminum wires and cables of various sizes. These wires and cables are cut from reels as needed. The material quantities are difficult to anticipate before the start of the job. Therefore it would be very difficult or not economical to plan for the exact amount. Every site condition is different. For rebuilds, this would prove to be even more difficult since in many cases, there is integration with existing equipment of different vintage. It is impossible to know all field conditions and anticipate every scenario. Not allowing the field crews this flexibility to work according to site conditions would cause unnecessary job delays.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	2016 WOOD AND CONCRETE POLE INSTALLATIONS
PROGRAM NAME:	WOOD AND CONCRETE POLE INSTALLATIONS
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	BRANKO BORAS
BUSINESS CASE #:	2016-C0561-4 / 2016-C0561-5

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This program is needed to ensure that substandard wood poles and cross arms that have reached their end of life are replaced on an annual basis. A major component of Enersource's overhead distribution system are wooden poles. EHM has approximately 12,800 wood poles and 7,900 concrete poles which support approximately 1,800km of overhead primary and over 1,300 km of overhead secondary circuits. This program funds the spot replacement of poles over various parts of the City that have been determined to be at the end of life. Poles deteriorate over time and when their strength is reduced to the point that there is a risk of failure under adverse weather conditions then they are deemed to be at end of life. The safe, reliable operation of the distribution system depends on the condition of pole assets. Pole condition is routinely assessed by operational personnel performing work on a pole such as switching or other asset replacement (transformers, insulators, lightning arrestors, etc.). The outside crews advise the Overhead Maintenance Supervisor directly or the Control Room of poles that are in poor condition. If the Control Room gets the information they generate a report and send it to the Overhead Maintenance Supervisor for follow-up. Project Budget (Wood Poles): \$400,000 Project Budget Concrete Poles): \$800,000

PROJECT BENEFITS / RISKS MITIGATED

Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.

Poles in “poor” condition that are not identified as a part of a distribution system renewal project are replaced under this program. This is required to ensure that substandard wood poles, cross arms and concrete poles that have reached their end of life are replaced on an annual basis. This program would also replace poles that are in “poor” condition and considered an emergency such as a rotten pole or those affected by a failure or event such as a pole fire, car accident, weather storm or tree falling on the power line.

A major component of Enersource’s overhead distribution system is wood and concrete poles. Enersource has over 12,000 wood poles and over 8,200 concrete poles which support approximately 1,800 km of overhead primary and over 1,200 km of overhead secondary circuits.

Poles deteriorate over time and when their strength is reduced to the point that there is a risk of failure under adverse weather conditions, they are deemed to be at end of life. The safe, reliable operation of the distribution system depends on the condition of pole assets. Pole condition is routinely assessed by operational personnel performing work on a pole such as switching or other asset replacement (such as transformers, insulators, and lightning arrestors). Furthermore, during the pole numbering project Enersource identified numerous poles that are in poor condition and are flagged for replacement by area.

Wood poles are naturally grown material; therefore all of the poles differ in internal structure and consequently in mechanical strength. Degradation of the pole’s strength involves naturally occurring fungi that attack and degrade the wood, which results in decay. The severity of the degradation depends on several factors such as location, treatment, type of wood, and installation practices. Wood poles can also be damaged by woodpeckers, termites or pole fires, which are caused by current leakage during insulator tracking. In addition, some wood poles were painted grey in the past to improve visual appeal but as a result, the paint trapped moisture inside the pole and has accelerated decay.

Failures of concrete poles may be caused by deterioration of the steel re-bars inside the pole due to exposure to corrosive chemicals in the soil, or road salt used in the winter. The severity of the degradation depends on several factors such as location, rusting of the exposed re-bars and whether a protective coating was used on the below ground section of the pole.

Since distribution and subtransmission poles support bare overhead wires and other equipment, failure of a pole is very serious, especially since the general public may come in contact with live conductors. In addition, depending on the number of circuits supported by the pole and the voltage, failure may disrupt power to thousands of customers.

Enersource inspection team carries out detailed field inspection of both wood and concrete poles and associated distribution equipment (e.g. transformers, overhead switches). The condition of the poles is recorded through field tablets and imported into the Geographical Information System (GIS). Subsequent geo-spatial maps are generated to identify areas that require pole replacement, as shown in Appendix below.

OPTIONS CONSIDERED: Delay pole replacements vs proactive replacements

Deteriorated or damage poles need to be changed as they are found because they support the overhead power system.

Pole replacement can be temporarily deferred depending on the number of customers that could be affected by the pole breaking but ultimately the poles will need replacement at some point.

Sometimes replacement is delayed if the area is destined for a complete overhead rebuild or there will be another project like a road widening coming up.

There would be an increase in the risk of equipment failure under adverse conditions, leading to reduced reliability and safety hazards to the public and EHM personnel.

Over the long term there is a strong business need to replace poles in a proactive manner.

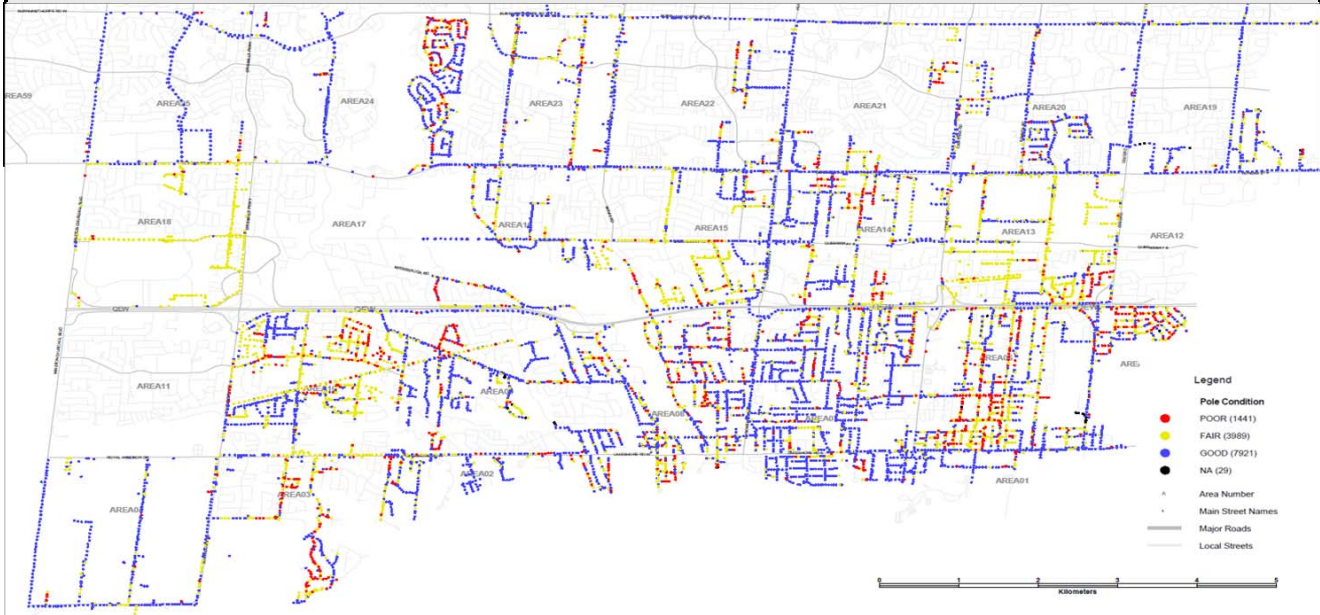
SOLUTION PROPOSED:

Replacement of wood and concrete poles that were identified in "poor" condition and at the end of their useful life through field inspections will allow Enersource to provide reliable power to its customers and avoid safety hazards due to falling overhead equipment. Delaying replacement of end-of-life poles may pose, both reliability and safety risk.

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Pole condition identified through field inspections







PROJECT SHEET	
PROJECT NAME:	2016 MISC CAPITAL
PROGRAM NAME:	MISCELLANEOUS CAPITAL
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	BRANKO BORAS
BUSINESS CASE #:	2016-C0561-6

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> Miscellaneous capital program includes replacement of miscellaneous equipment that is required for reliable and safe operation of the distribution system, including fault indicators, animal protection and grounding replacements. Each of these components ensure that system reliability and safety of public and Enersource employees is maintained. Project Budget: \$200,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> In 2014, animal contacts have resulted in over 170 sustained outages and close to 350,000 customer minutes. Continued effort to identify problem areas due to animal contacts and installing animal protection will play an important role to minimize sustained and momentary outages experienced by customers. Enersource has deployed numerous fault indicators throughout its distribution system. There are several different types of fault indicators currently deployed on the distribution system and the replacement program is aimed at adding fault indication to areas where fault indication is absent, as well as replacing older technology fault indicators that are obsolete or prone to malfunction. Fault Indicators are significant to the distribution system because they reduce fault locating times, improving outage response and, consequently, outage restoration times. They also assist in ascertaining the root cause of transient faults (i.e. auto Reclosures). The deployment of functional fault indicators are crucial to maintaining high levels of reliability and customer service and to achieving gains in operational efficiency. In addition, the replacement of missing grounding identified by field inspections will allow Enersource to ensure public and personnel safety.

OPTIONS CONSIDERED: Delay installation of miscellaneous capital equipment vs. proactive replacement

Deferring installation of miscellaneous equipment may pose both a reliability and safety risk to Enersource. These components allow Enersource to mitigate the negative impacts which animal contacts and outages in general have on reliability performance. In addition, maintaining proper grounding of overhead equipment ensures minimal risk to the public and Enersource personnel.

SOLUTION PROPOSED:

The proposed solution maintains adequate replacement of miscellaneous equipment in the distribution system to ensure mitigation of animal contacts, faster restoration time and ensuring continued safety of the public and Enersource personnel.

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT SHEET	
PROJECT NAME:	VERMOUTH/BRECKENRIDGE
PROGRAM NAME:	OVERHEAD REBUILDS
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0561-7

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This project involves replacing 20 poles along Vermouth Avenue and Breckenridge Road. The majority of these poles were identified as being in "poor" condition through field inspections. In addition, this project includes replacement of overhead transformers (dating back to 1960's) with PCB content between 2 and 50 ppm and upgrading the pole line to a current design and construction standards (e.g. removal of open bus secondaries), in turn making it safer, more reliable and less susceptible to adverse weather conditions. In addition, the outdated pin-top insulators will be changed to polymer style, which will reduce the risk of pole fires. Project Budget: \$360,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This project will ensure that 20 poles with associated overhead distribution assets (i.e. transformers, insulators) are replaced and brought to the most current standard. The existing pole lines have porcelain insulators which are flagged as having a higher risk of resulting in pole fires. In addition, this project will ensure replacement of transformers with PCB content 2 to 50ppm, thereby reducing an environmental risk. The poles were found to be in "poor" condition and the replacement of these assets will ensure that equipment failure and customer outages are minimized.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Holburne - Section 1
PROGRAM NAME:	OVERHEAD REBUILDS
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0561-8

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This project will be section one of two sections. It involves replacing 20 poles along Holburne Road (including some poles on nearby Deborah Drive and Ogden Ave). The majority of these poles were identified as being in poor condition through field inspections. The poles are also comprised of the older square concrete pole design that is susceptible to rusting of the internal rebar and spalling of the concrete surface thereby weakening the poles. In addition, this project includes replacement of overhead transformers (dating back to 1960's) with PCB content between 2 and 50 ppm, replacement of transformers that show evidence of leaking, and upgrading the pole line to a current design and construction standards (e.g. taller pole, vertical framing, additional working clearances, etc.), in turn making it safer, more reliable and less susceptible to adverse weather conditions. In addition the outdated nin-ton insulators will be changed to polymer style which will reduce the risk of pole fires

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This project will ensure that 20 poles with associated overhead distribution assets (i.e. transformers, insulators) are replaced and brought to the most current design and construction standards. The existing pole lines have porcelain insulators which are flagged as having higher risk of resulting in pole fires. In addition, this project will ensure replacement of transformers with PCB content 2 to 50ppm, thereby reducing an environmental risk. The poles were found to be in "poor" condition and the replacement of these assets will ensure that equipment failure and customer outages are minimized. Moreover, square-style concrete poles, which were found to be of poor structural integrity, will also be replaced during this project. Project Budget: \$360,000

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Meadow Wood - Country Club
PROGRAM NAME:	OVERHEAD REBUILDS
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0561-9

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This project involves replacing 65 poles along Meadow Wood Road and Country Club Crescent (including poles on Apple Lane and Watersedge Road). The majority of these poles were identified as being in "poor" condition through field inspections. In addition, this project includes replacement of overhead transformers (dating back to 1960's) with PCB content between 2 and 50 ppm, replacement of transformers that show evidence of leaking, and upgrading the pole line to a current design and construction standards (e.g. removal of open bus secondaries), in turn making it safer, more reliable and less susceptible to adverse weather conditions. In addition, the outdated pin-top insulators will be changed to polymer style, which will reduce the risk of pole fires. Project Budget: \$1,170,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This project will ensure that 65 poles with associated overhead distribution assets (i.e. transformers, insulators) are replaced and brought to the most current standard. The existing pole lines have porcelain insulators which are flagged as having higher risk of resulting in pole fires. In addition, this project will ensure replacement of transformers with PCB content 2 to 50ppm, thereby reducing an environmental risk. The poles were found to be in "poor" condition and the replacement of these assets will ensure that equipment failure and customer outages are minimized. This project will also include replacement of open bus secondaries, which are more prone to tree contacts and may result in poor reliability performance.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Hull - Studley
PROGRAM NAME:	OVERHEAD REBUILDS
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0561-10

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This project involves replacing 40 poles along Hull Street and Studley Street. The majority of these poles were identified as being in "poor" condition through field inspections. In addition, this project includes replacement of the old style open secondaries and upgrading the pole line upgraded to a current design and construction standards (e.g. removal of wood cross arm installation, and pin-top insulators), in turn making it safer, more reliable and less susceptible to adverse weather conditions. Also, this project includes replacement of overhead transformers with PCB content between 2 and 50 ppm. In addition, the change of outdated pin-top insulators to polymer style will reduce the risk of pole fires. Project Budget: \$720 000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This project will ensure that 40 poles with associated overhead distribution assets (i.e. transformers, insulators) are replaced and brought to the most current standard. The existing pole lines have porcelain insulators which are flagged as having higher risk of resulting in pole fires. In addition, this project will ensure replacement of transformers with PCB content 2 to 50ppm, thereby reducing an environmental risk. The poles were found to be in "poor" condition and the replacement of these assets will ensure that equipment failure and customer outages are minimized.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Wharton Way - Berkel
PROGRAM NAME:	OVERHEAD REBUILDS
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0561-11

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This project involves replacing 20 poles along Wharton Way and Berkel Road. The majority of these poles were identified as being in "poor" condition through field inspections. In addition, this project includes replacement of overhead transformers (dating back to 1960's) with PCB content between 2 and 50 ppm and upgrading the pole line upgraded to a current design and construction standards (e.g. wood cross arm construction and pin-top ceramic insulators), in turn making it safer, more reliable and less susceptible to adverse weather conditions. In addition, the change of outdated pin-top insulators to polymer style will reduce the risk of pole fires. Project Budget: \$360,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This project will ensure that 20 poles with associated overhead distribution assets (i.e. transformers, insulators) are replaced and brought to the most current standard. The existing pole lines have porcelain insulators which are flagged as having higher risk of resulting in pole fires. In addition, this project will ensure replacement of transformers with PCB content 2 to 50ppm, thereby reducing an environmental risk. The poles were found to be in "poor" condition and the replacement of these assets will ensure that equipment failure and customer outages are minimized.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Credit Woodlands - Section 2
PROGRAM NAME:	OVERHEAD REBUILDS
BUSINESS UNIT:	C0561 - O/H DISTRIBUTION UPGRADES
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0561-12

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This project is the second section in a three section project. It involves replacing 40 poles along The Credit Woodlands. The majority of these poles were identified as being in "poor" condition through field inspections. In addition, this project includes replacement of overhead transformers that have been identified as having major leaks and upgrading the pole line upgraded to a current design and construction standards (e.g. removal of open bus secondaries, wood cross-arm framing, and pin top porcelain insulators, etc.), in turn making it safer, more reliable and less susceptible to adverse weather conditions. In addition, the change of outdated pin-top insulators to polymer style will reduce the risk of pole fires. Project Budget: \$720 000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This project will ensure that 40 poles with associated overhead distribution assets (i.e. transformers, insulators) are replaced and brought to the most current standard. The existing pole lines have porcelain insulators which are flagged as having higher risk of resulting in pole fires. In addition, this project will ensure replacement of transformers with PCB content 2 to 50ppm, thereby reducing an environmental risk. The poles were found to be in "poor" condition and the replacement of these assets will ensure that equipment failure and customer outages are minimized.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT BUSINESS CASE	
PROJECT NAME:	2016 SUBDIVISION REBUILDS
PROGRAM NAME:	SUBDIVISION REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDHU
INITIATOR:	ALYKHAN PREMJI
DEPARTMENTS INVOLVED:	Asset Operations Underground, Asset Management, Purchasing
DATE SUBMITTED:	September-04-15
DATE APPROVED:	September-04-15
DATE STARTED:	September-04-15
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0505-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Programs and projects that are included within this section deal with the replacement of underground cables, transformers and components that have reached their expected end of life and have been determined to have unacceptable operational risks. Underground cable failures are the leading cause of equipment failures in the distribution system and present a significant amount of operational risk to Enersource. To address this risk, Enersource plans and executes an ongoing subdivision rebuild replacement program based on a significant amount of qualitative and quantitative analysis. On an annual basis, the worst performing areas of the underground cable system are identified and ranked according to operational risk, impact to customers and financial consequences while considering labour availability and other constraints. To determine the worst performing areas, a number of criteria are considered including: number of cable failures, age of the cable, cable type installed, transformer condition, and the criticality of the customers affected. Most of the cables installed before 1989 either do not have a jacket and/or were not installed in ducts and thus, are more susceptible to failure. Furthermore, the failure analysis has confirmed that 83% of failures over the last 5 years has occurred on unjacketed PE or XLPE cable. This is a result of natural aging process as well as the fact that the immature technology used in some early cable systems dating back to 1960's and 1970's is decidedly inferior compared to technologies used today. Increasing failure rates in these older systems are now adversely impacting system reliability and it is readily apparent that action is necessary to manage the consequences of this trend. The typical life expectancy for new or replacement underground cable is approximately 40 years. As time progresses and the cable system ages, the bulk dielectric strength degrades resulting in overall aging of the cable system. The exact way in which the strength of a cable degrades can occur as a result of the following: 1. Manufacturing Imperfections (e.g. voids, contaminants in insulation, poor application of shield material) 2. Poor Workmanship (e.g. dust, contamination, misalignment of accessories) 3. Adverse Environment (e.g. transformer oil leaks, floods, high rates of corrosion, water trees) 4. Overheating (e.g. excessive conductor current for an operating condition) 5. Mechanical (e.g. damage during transportation, installation) The specific locations of the yearly rebuild projects are prioritized by using three years of operational data, ranked by age, number and

Enersource has reviewed several presentations/methods used by other utilities to identify worst feeders in the system. The following methods were reviewed:

- Feeder Vulnerability Study - Hydro One performance analysis;
- Feeder Reliability Management - Toronto Hydro;
- Worst Performing Feeders - Power System Solutions International (for CEA); and
- Worst Feeder Methodology - Presented by Hydro Ottawa at the 2012 EDIST conference.

Enersource used spreadsheets in the past to list the worst feeders. In 2011, Enersource began to follow the Hydro Ottawa methodology with some variations. This methodology was tested using spreadsheets before being implemented in Enersource's IOM reporting tool to identify the worst feeders in the system.

Enersource has enhanced its worst feeder reports and has begun to apply improved methodology to identify operational impacts at the transformers level in the system. Some of the reasons for this change are:

- Normal system configuration and abnormal configuration can skew reliability measures;
- Worst feeder may not clearly identify worst area of the system since the feeder can run a few kilometers;
- IOM statistics are recorded against each transformer (with few exceptions);
- Inspection data and manufacturer info can easily be used to refine reporting on reliability impacts at the transformer level;
- Transformer outage data is a good proxy to indicate poor performing areas in the system; and
- History and details of reliability statistics of each transformer remains in the IOM data base for future reference.

Methodology

Once the rank for each transformer is calculated based on reliability history, additional factors are considered to select areas with poor performance and equipment that is at the end of life, critical to the system or equipment needs to be replaced due to regulatory requirements.

Below are the factors involved to decide the areas that need to be rebuilt:

1. Reliability – based on the Worst Feeder methodology;
2. Transformers that are leaking oil;
3. Transformers that contain PCB;
4. Health Index of the cables and transformers;
5. Frequency of cable failures;
6. Age of the cables and transformers; and
7. Transformers that are located in rear lots with poor access.

Once the projects are selected using the factors shown above, they are then scrutinized by both the Asset Management and the Asset Operations groups in order to ensure the project scope and boundaries are properly defined.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers. Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed. Several transformers contain PCB's, which will be removed from the system to avoid possible environmental spill or soil contamination. Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult and costly. Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Operate with existing underground cables**

With this option, the underground cables will continue to fail and cause power outages, resulting in deteriorating reliability. In addition, the corrosion of pad mounted equipment may pose a safety risk since unauthorized people could access the high voltage components. Also, some transformers contain PCB's, which in the event of an oil spill could contaminate the soil around them and result in hazardous condition for the general public and non-compliance with MOE standards.

OPTION 2: **Installation of overhead pole line**

City by-laws and potential pushback from affected property owners in the area often make construction of a new overhead pole line unfeasible.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Remove old distribution cables and transformers and install new distribution cables In addition, replace all old transformers, switches, cutouts and other distribution equipment that have reached the "end of useful life".

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 8 - Significant improvement to ESQR <u>Support:</u> Replacing aging underground equipment that minimizes the impact to the reliability, environment, customers and safety and thus leads to the improvement in ESQRs. By replacing aging cable systems and associated distribution equipment will ensure that power outages are avoided thus resulting in reduced number of incoming calls to the call centre and emergency response required by field staff.
	Customer Satisfaction Does this project add Customer Value? 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> Replacing aging underground equipment ensures reliable supply of power that customers expect.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 10 - Prevents or significantly reduces likelihood of irreparable brand damage <u>Support:</u> By executing these projects, the risk of poor reliability and environmental damage is being reduced and would not have a negative impact on Enersource's reputation.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 10 - Potential loss of life <u>Support:</u> The corrosion of pad mounted equipment leads to holes which may pose a safety risk since unauthorized people could access the high voltage components which may lead to loss of life.
	Environmental Impact/risk This projects mitigates exposure that could cause: 8 - High environmental impact <u>Support:</u> Number of pad mounted transformers with PCB greater than 2ppm installed and/or showing evidence of leaking. Underground transformers with PCB and the ones that are leaking will be removed in order to reduce the risk of environmental spill and/or soil contamination.
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> The underground cables feed large number of residential, commercial and industrial customers which, in case of a failure, would result in a significant degradation of reliability performance.
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Higher rated underground pad mounted transformers and cables will be installed in order to support future increase in consumption and avoid potential over loading issues.
	System Renewal This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor" <u>Support:</u> Various underground equipment proposed to be replaced were rated as very poor as per the ACA analysis.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? The underground cables will continue to fail and cause power outages, resulting in deteriorating reliability. In addition, the corrosion of pad mounted equipment may pose a safety risk since unauthorized people could access the high voltage components. Also, some of the transformers in this rebuild contain PCB's, which in the event of an oil spill could contaminate the soil around them and result in MOE fines.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 5 - > \$50,000
	<u>Support:</u> Planned replacement of underground equipment costs much less than “emergency” or reactive replacements and are less disruptive to customers.	
	One-Time Costs	This project will incur/create one-time costs of: \$13,250,000
	<u>Support:</u> See below for details.	
	Ongoing Costs	This project will incur/create ongoing costs of: _____
	<u>Support:</u>	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 45 years What type of assets are being replaced? Underground cables and padmounted transformers
		Anticipated Derecognition _____

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

Ellengale - Ibbetson Cres/ Shamir	\$	2,000,000
Rockwood - Fieldgate/ Maple Ridge	\$	1,500,000
Clarkson - Bromsgrove/ Cramer/Sherhill	\$	1,750,000
Campobella/ Argentia	\$	1,000,000
Baldwin/ Melton	\$	1,500,000
Malton - Wrenwood/ Rockhill/ Bayswater	\$	1,500,000
Woodlands/ Wiltshire	\$	1,500,000
Autumn Harvest Section 3 - Wagondust	\$	1,500,000
Mississauga Valley Blvd feeder - North side	\$	1,000,000
TOTAL	\$	13,250,000

PROJECT APPROVALS

 Business Unit Manager / Division Director

 Date

 Key Stakeholder (if appropriate)

 Date

 VP, Division

 Date

 VP, Asset Management Strategy

 Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 5 - > \$50,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i></i> <i>Initial Assessment:</i> \$13,250,000 <i>Variance:</i> <u>(\$13,250,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i></i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - Significant improvement to ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Direct positive impact that will be reflected on next customer survey <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevents or significantly reduces likelihood of irreparable brand damage <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Potential loss of life <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - High environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - ACA health index "Very Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



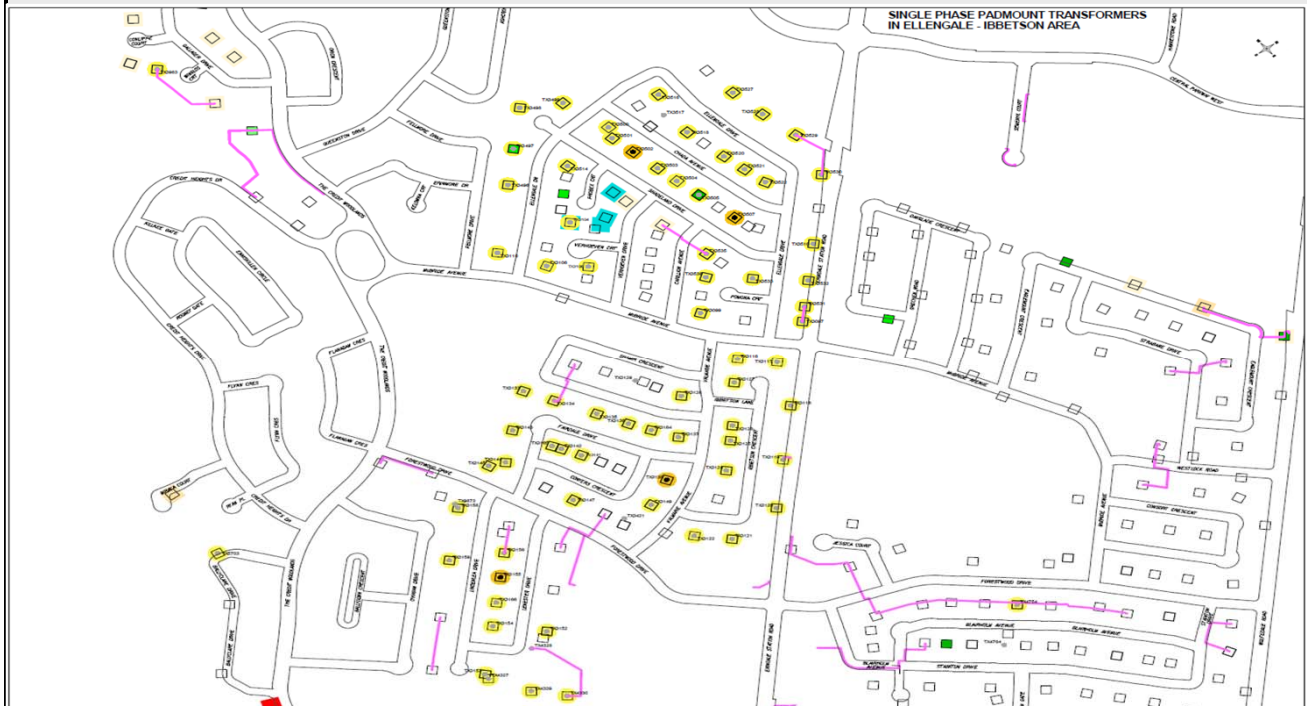
PROJECT SHEET	
PROJECT NAME:	Ellengale - Ibbetson Cres/Shamir
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1A

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The underground distribution equipment in the residential rebuild area are rear lot and approximately 49 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original cables, transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. This rebuild area contains transformers that are leaking, have PCB levels greater than 2ppm and are located in customers backyard which in some cases result in access issues by our field staff. Moreover, the distribution equipment in this area, especially underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$2,000,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB’s, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



Legend

- Single Phase Padmount Transformers by Health Index**
 - Very Poor
 - Poor
- Single Phase Padmount Transformers by TX Location**
 - BACK
- Single Phase Padmount Transformers by External Oil Leaking**
 - MAJOR
 - MINOR
 - MODERATE
 - YES
- Single Phase Padmount Transformers by PCB Level**
 - GREATER THAN 50 PPM
 - LESS THAN 50 PPM
- Worst Single Phase Padmount Transformers**
 - 1 to 200
 - 200 to 400
 - 400 to 600
 - 600 to 800
 - 800 to 1000
 - 1000 to 1200
- Cable Faults
- A Street Names
- Street Lines



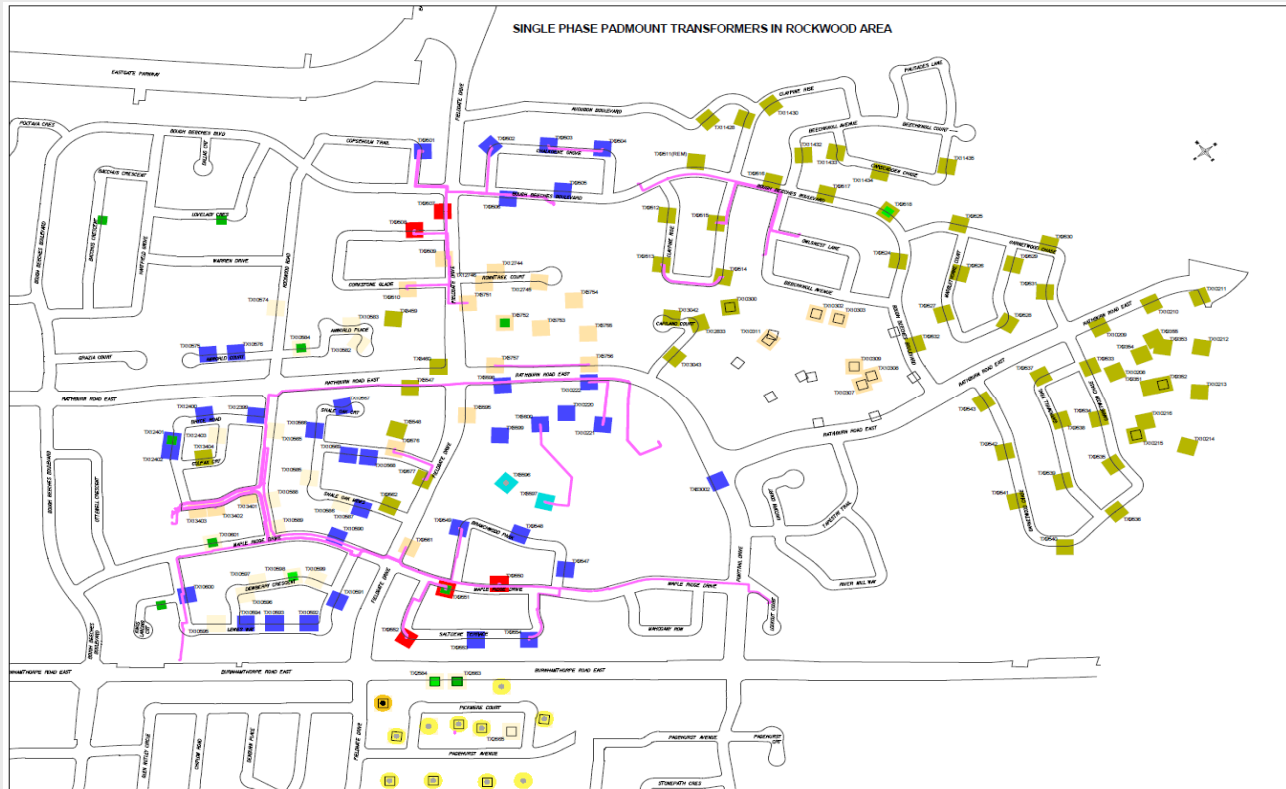
PROJECT SHEET	
PROJECT NAME:	Rockwood-Fieldgate&Maple Rdg
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1B

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The front lot underground primary 1/0 cables in the residential rebuild area are approximately 40 years old and have reached the “end of useful life”. This rebuild area contains underground cables that have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated very poor by Kinectrics through the ACA. Project Cost: \$1,500,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB's, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



Legend

- Single Phase Padmount Transformers by Health Index**
 - Very Poor
 - Poor
- Single Phase Padmount Transformers by TX Location**
 - BACK
- Single Phase Padmount Transformers by External Oil Leaking**
 - MAJOR
 - MINOR
 - MODERATE
 - YES
- Single Phase Padmount Transformers by PCB Level**
 - GREATER THAN 50 PPM
 - LESS THAN 50 PPM
- Worst Single Phase Padmount Transformers**
 - 1 to 200
 - 200 to 400
 - 400 to 600
 - 600 to 800
 - 800 to 1000
 - 1000 to 1200
- Cable Faults
- A Street Names
- ▭ Street Lines



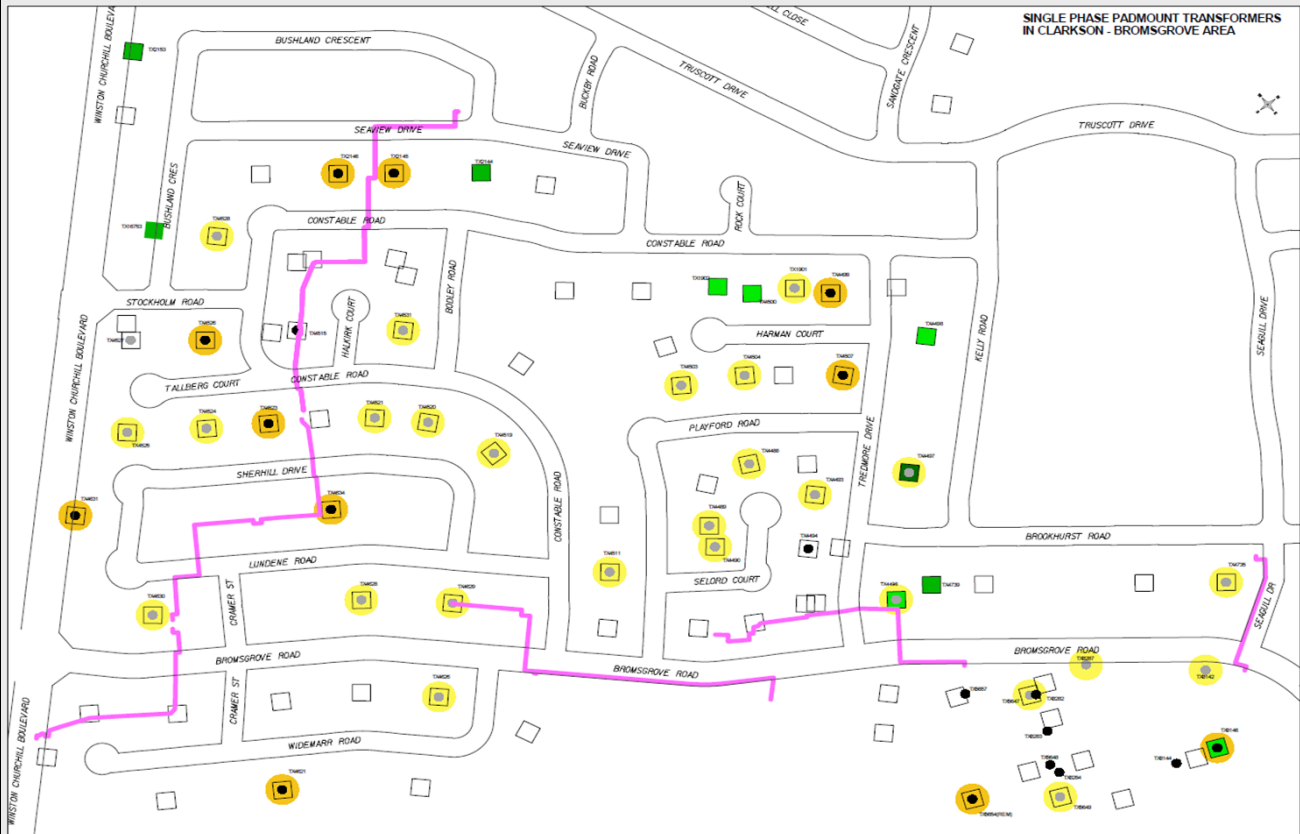
PROJECT SHEET	
PROJECT NAME:	Clarkson-BromCrameSherhil
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1C

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The rear lot underground distribution equipment in the residential rebuild area are approximately 45 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original cables, transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. This rebuild area contains transformers that are leaking, have PCB levels greater than 2ppm and are located in customers backyard which in some cases result in access issues by our field staff. Moreover, the distribution equipment in this area, especially underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$1,750,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB's, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



Legend

- Single Phase Padmount Transformers by Health Index**
 - Very Poor
 - Poor
- Single Phase Padmount Transformers by TX Location**
 - BACK
- Single Phase Padmount Transformers by External Oil Leaking**
 - MAJOR
 - MINOR
 - MODERATE
 - YES
- Single Phase Padmount Transformers by PCB Level**
 - GREATER THAN 50 PPM
 - LESS THAN 50 PPM
- Worst Single Phase Padmount Transformers**
 - 1 to 200
 - 200 to 400
 - 400 to 600
 - 600 to 800
 - 800 to 1000
 - 1000 to 1200
- Cable Faults
- A Street Names
- ▭ Street Lines



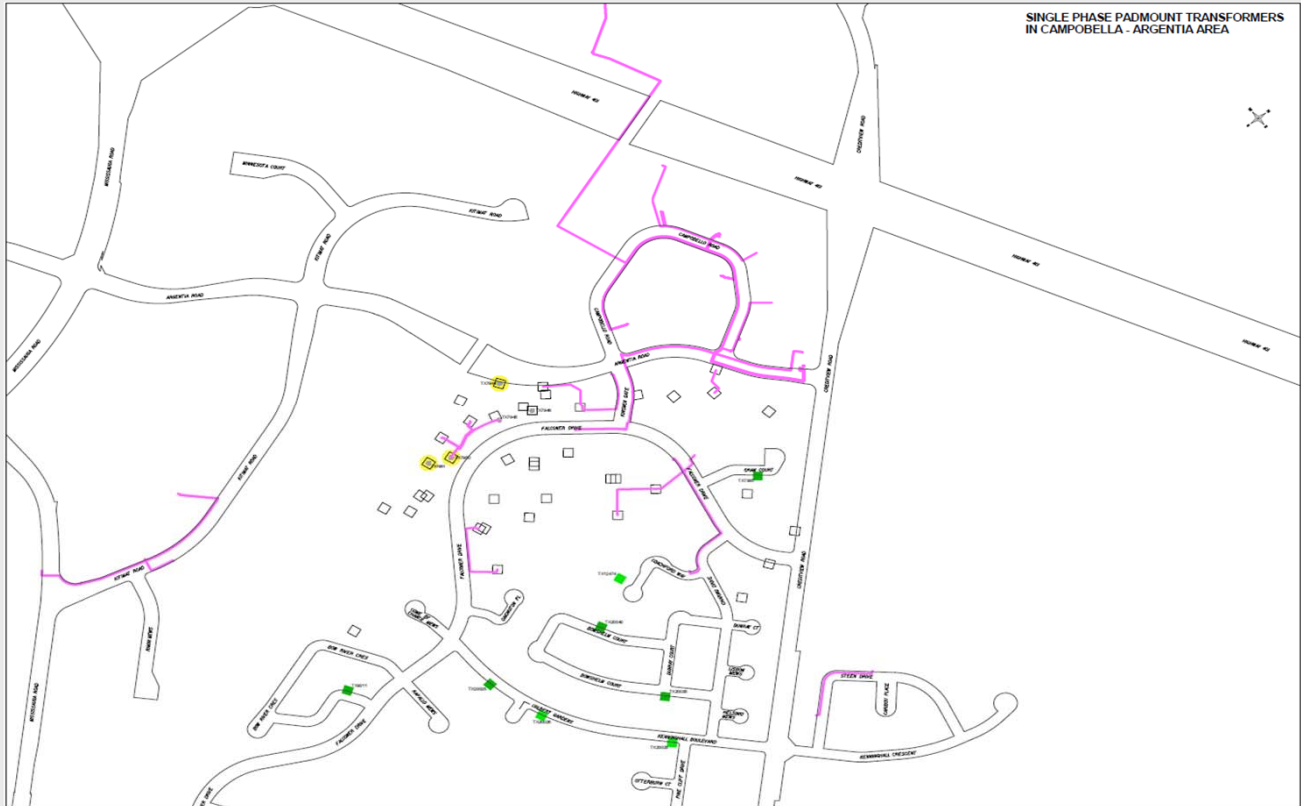
PROJECT SHEET	
PROJECT NAME:	Campobella & Argentia
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1D

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The front lot underground distribution equipment in the industrial/ commercial rebuild area are approximately 40 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original cables, transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. Moreover, the distribution equipment in this area, especailly underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$1,000,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB’s, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



Legend

Single Phase Padmount Transformers by Health Index

- Very Poor
- Poor

Single Phase Padmount Transformers by TX Location

- BACK

Single Phase Padmount Transformers by External Oil Leaking

- MAJOR
- MINOR
- MODERATE
- YES

Single Phase Padmount Transformers by PCB Level

- GREATER THAN 50 PPM
- LESS THAN 50 PPM

Worst Single Phase Padmount Transformers

- 1 to 200
- 200 to 400
- 400 to 600
- 600 to 800
- 800 to 1000
- 1000 to 1200

- Cable Faults
- A Street Names
- ▬ Street Lines



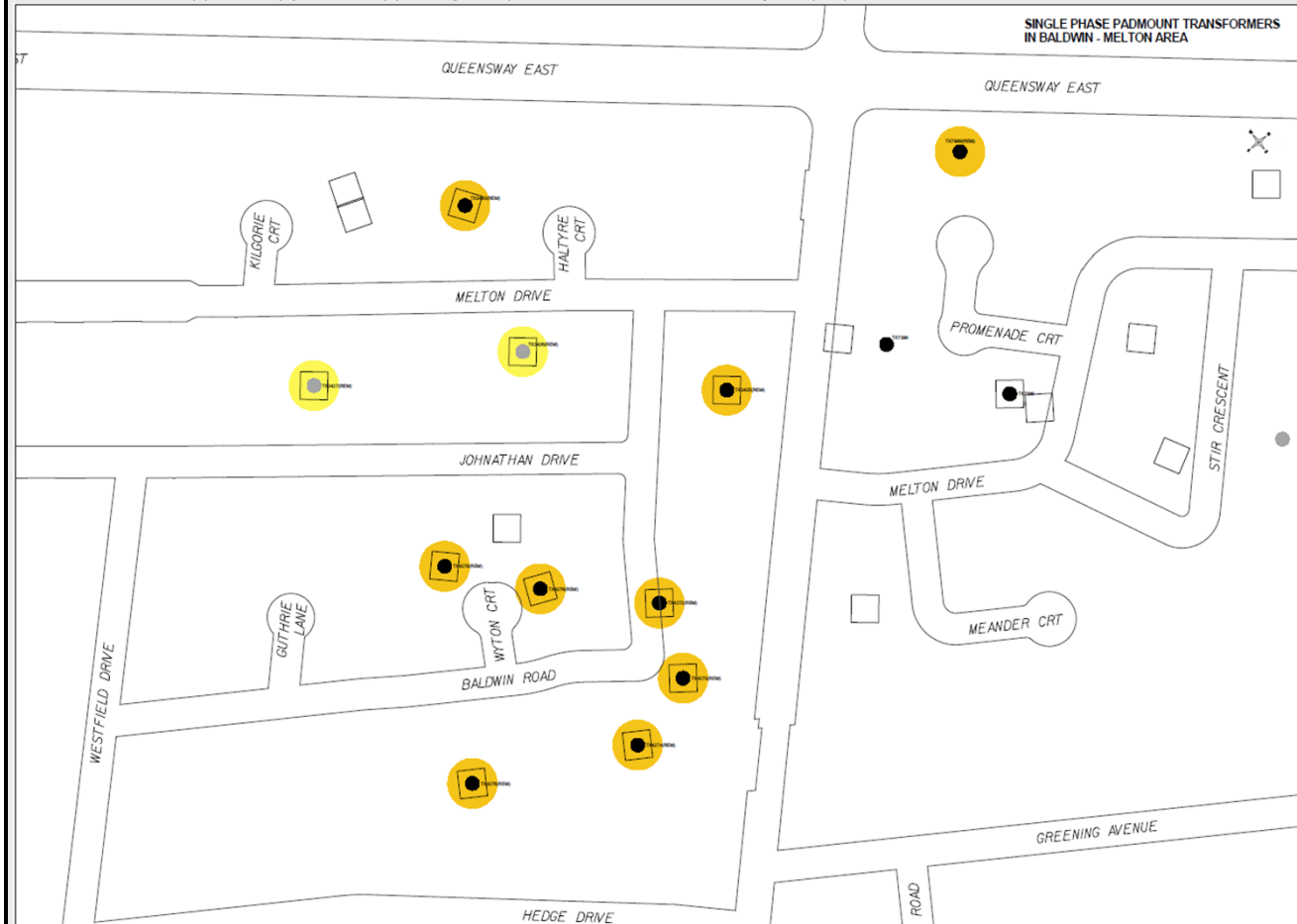
PROJECT SHEET	
PROJECT NAME:	Baldwin & Melton
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1E

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The underground distribution equipment in the residential rebuild area are approximately 50 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original cables, transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. This rebuild area contains transformers that are leaking, have PCB levels greater than 2ppm and are located in customers backyard which in some cases result in access issues by our field staff. Moreover, the distribution equipment in this area, especially underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$1,500,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB's, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



Legend

- Single Phase Padmount Transformers by Health Index**
 - Very Poor
 - Poor
- Single Phase Padmount Transformers by TX Location**
 - BACK
- Single Phase Padmount Transformers by External Oil Leaking**
 - MAJOR
 - MINOR
 - MODERATE
 - YES
- Single Phase Padmount Transformers by PCB Level**
 - GREATER THAN 50 PPM
 - LESS THAN 50 PPM
- Worst Single Phase Padmount Transformers**
 - 1 to 200
 - 200 to 400
 - 400 to 600
 - 600 to 800
 - 800 to 1000
 - 1000 to 1200
- Cable Faults
- A Street Names
- ▭ Street Lines



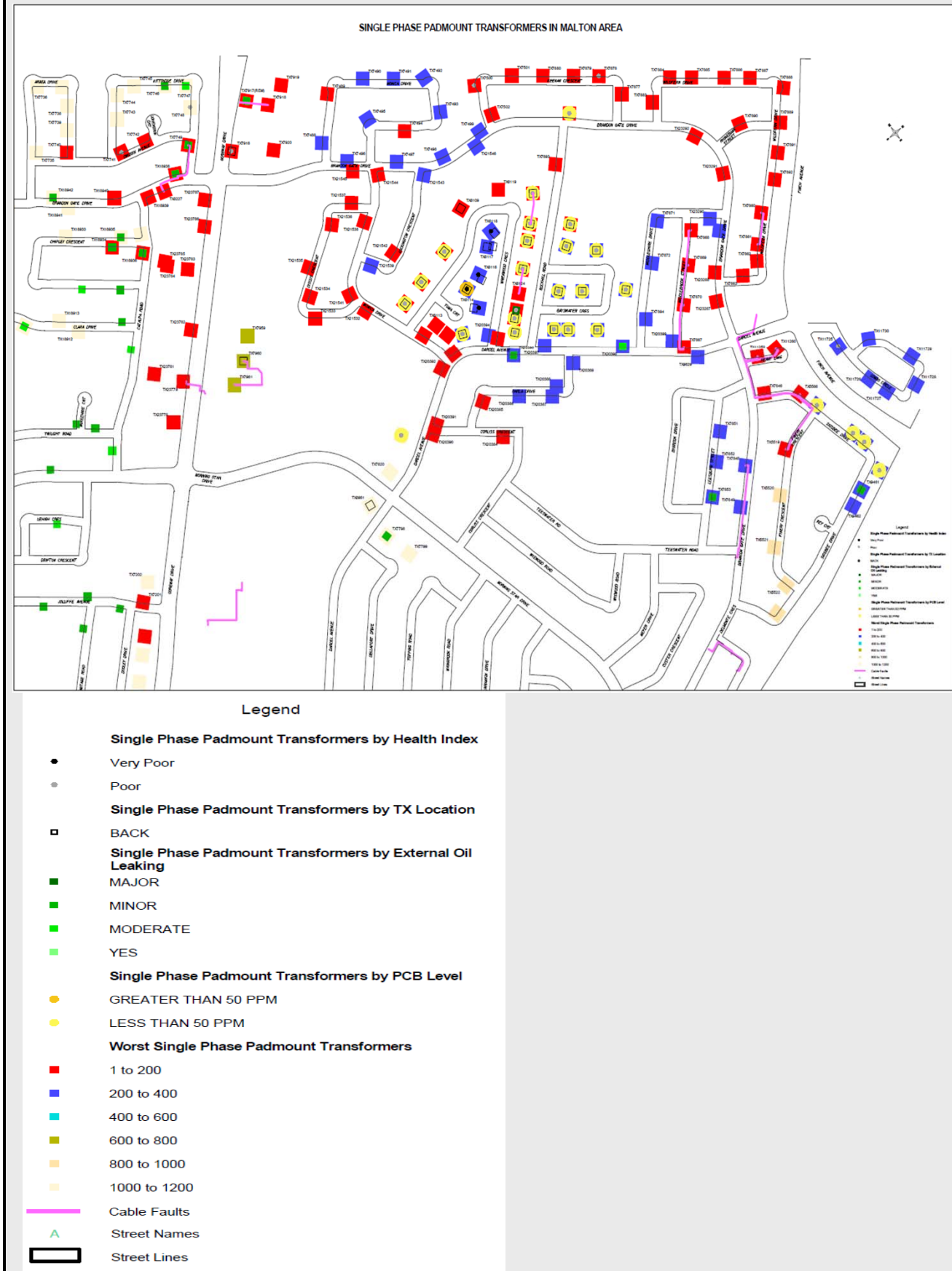
PROJECT SHEET	
PROJECT NAME:	Malton-WrenwdRockhillBayswtr
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1F

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The underground distribution equipment in the rear lot residential rebuild area are approximately 42 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original cables, transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. This rebuild area contains transformers that are leaking, have PCB levels greater than 2ppm and are located in customers backyard which in some cases result in access issues by our field staff. Moreover, the distribution equipment in this area, especially underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$1,500,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB’s, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)





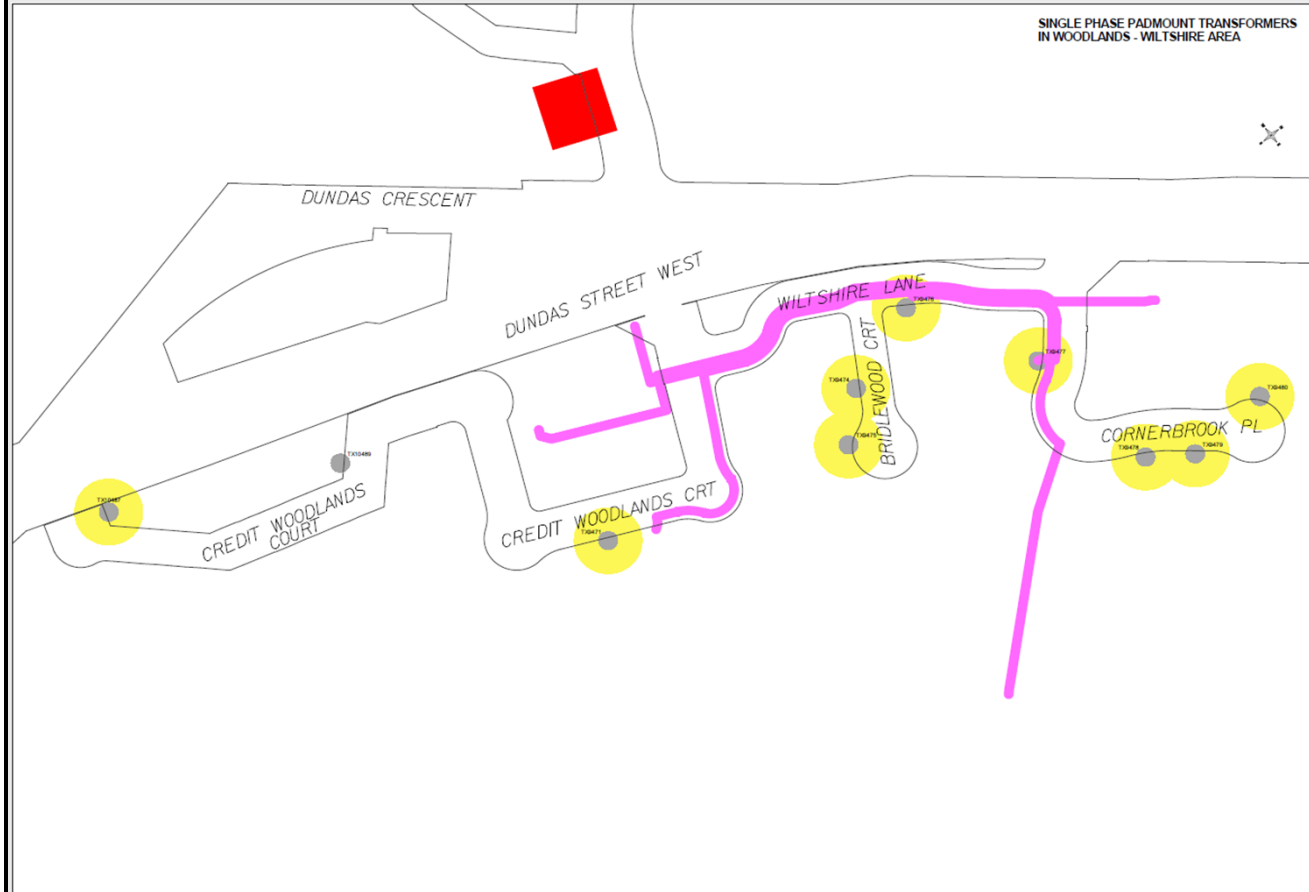
PROJECT SHEET	
PROJECT NAME:	Woodlands & Wiltshire
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1G

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The underground distribution equipment in the residentail front lot rebuild area are approximately 40 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original cables, transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. This rebuild area contains transformers that are leaking, have PCB levels greater than 2ppm. Moreover, the distribution equipment in this area, especailly underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$1,500,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB’s, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



Legend

- Single Phase Padmount Transformers by Health Index**
 - Very Poor
 - Poor
- Single Phase Padmount Transformers by TX Location**
 - BACK
- Single Phase Padmount Transformers by External Oil Leaking**
 - MAJOR
 - MINOR
 - MODERATE
 - YES
- Single Phase Padmount Transformers by PCB Level**
 - GREATER THAN 50 PPM
 - LESS THAN 50 PPM
- Worst Single Phase Padmount Transformers**
 - 1 to 200
 - 200 to 400
 - 400 to 600
 - 600 to 800
 - 800 to 1000
 - 1000 to 1200
- Cable Faults
- A Street Names
- ▬ Street Lines

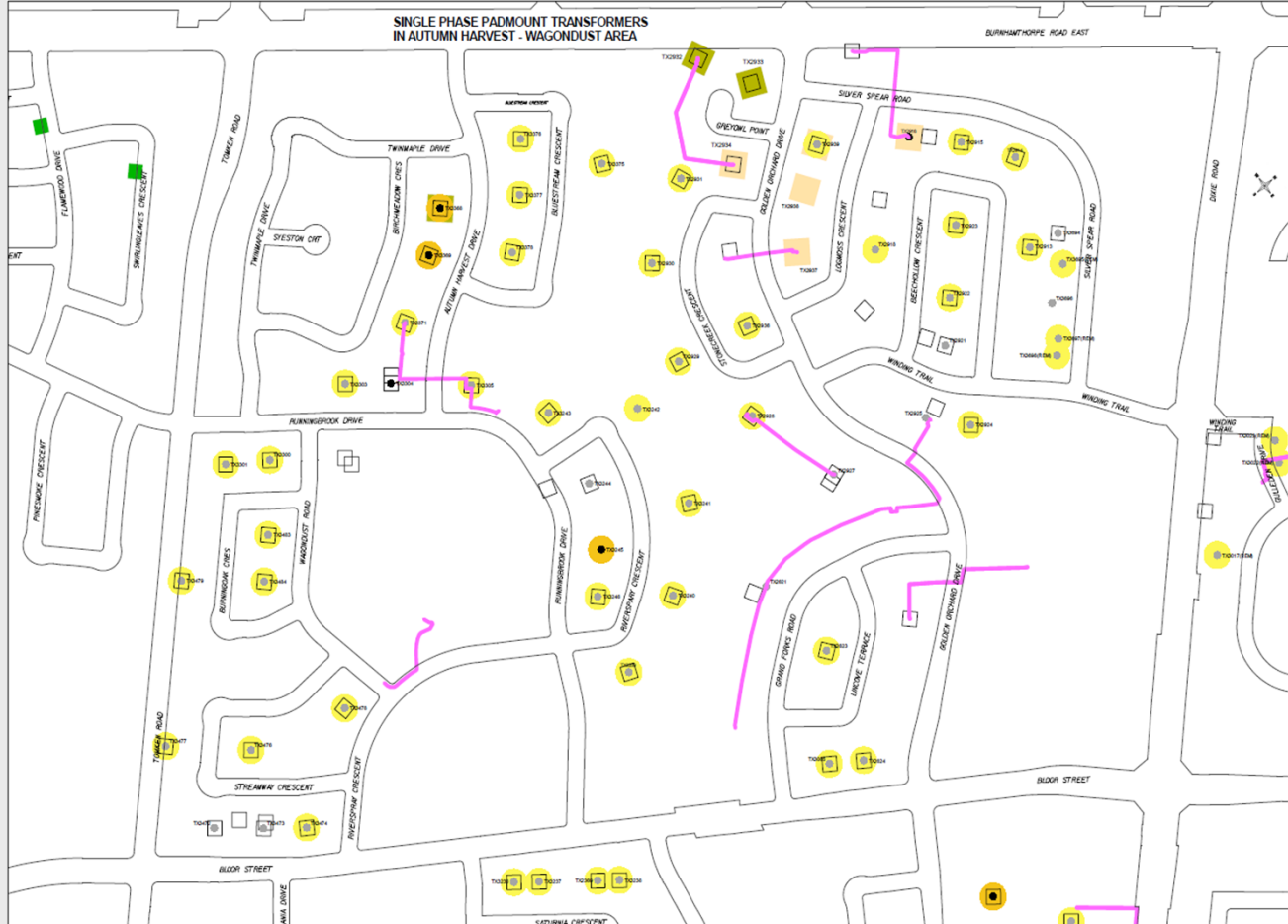


PROJECT SHEET	
PROJECT NAME:	AutumnHarvestSec3-Wagondust
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1H

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The underground distribution equipment in the rear lot residential rebuild area are approximately 51 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original cables, transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. This rebuild area contains transformers that are leaking, have PCB levels greater than 2ppm and are located in customers backyard which in some cases result in access issues by our field staff. Moreover, the distribution equipment in this area, especially underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$1,500,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB's, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



 Street Lines



PROJECT SHEET	
PROJECT NAME:	MissValleyBlvd-Northside
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505-1I

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The underground main feeder cables in the apartment/ condominium rebuild area are approximately 40 years old and have reached the “end of useful life”. This rebuild area contains underground main feeder cables that have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated very poor by Kinectrics through the ACA. Project Cost: \$1,000,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB’s, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)





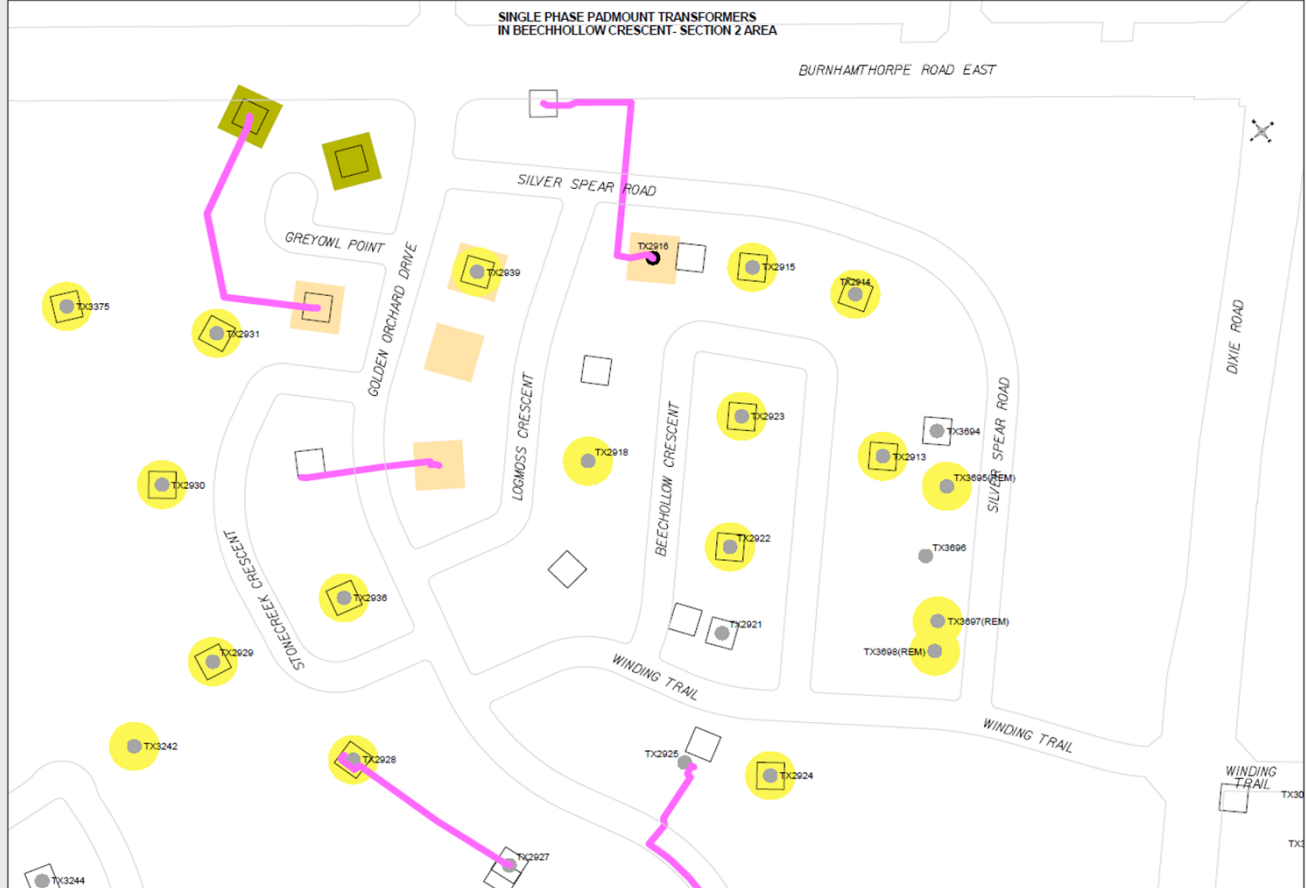
PROJECT SHEET	
PROJECT NAME:	Beechhollow Section 2
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The underground distribution equipment in the rear lot rebuild area are approximately 50 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original cables, transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. This rebuild area contains transformers that are leaking, have PCB levels greater than 2ppm and are located in customers backyard which in some cases result in access issues by our field staff. Moreover, the distribution equipment in this area, especially underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$xxxxxxxx

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB's, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



Legend

- Single Phase Padmount Transformers by Health Index**
 - Very Poor
 - Poor
- Single Phase Padmount Transformers by TX Location**
 - BACK
- Single Phase Padmount Transformers by External Oil Leaking**
 - MAJOR
 - MINOR
 - MODERATE
 - YES
- Single Phase Padmount Transformers by PCB Level**
 - GREATER THAN 50 PPM
 - LESS THAN 50 PPM
- Worst Single Phase Padmount Transformers**
 - 1 to 200
 - 200 to 400
 - 400 to 600
 - 600 to 800
 - 800 to 1000
 - 1000 to 1200
- Cable Faults
- A Street Names
- Street Lines



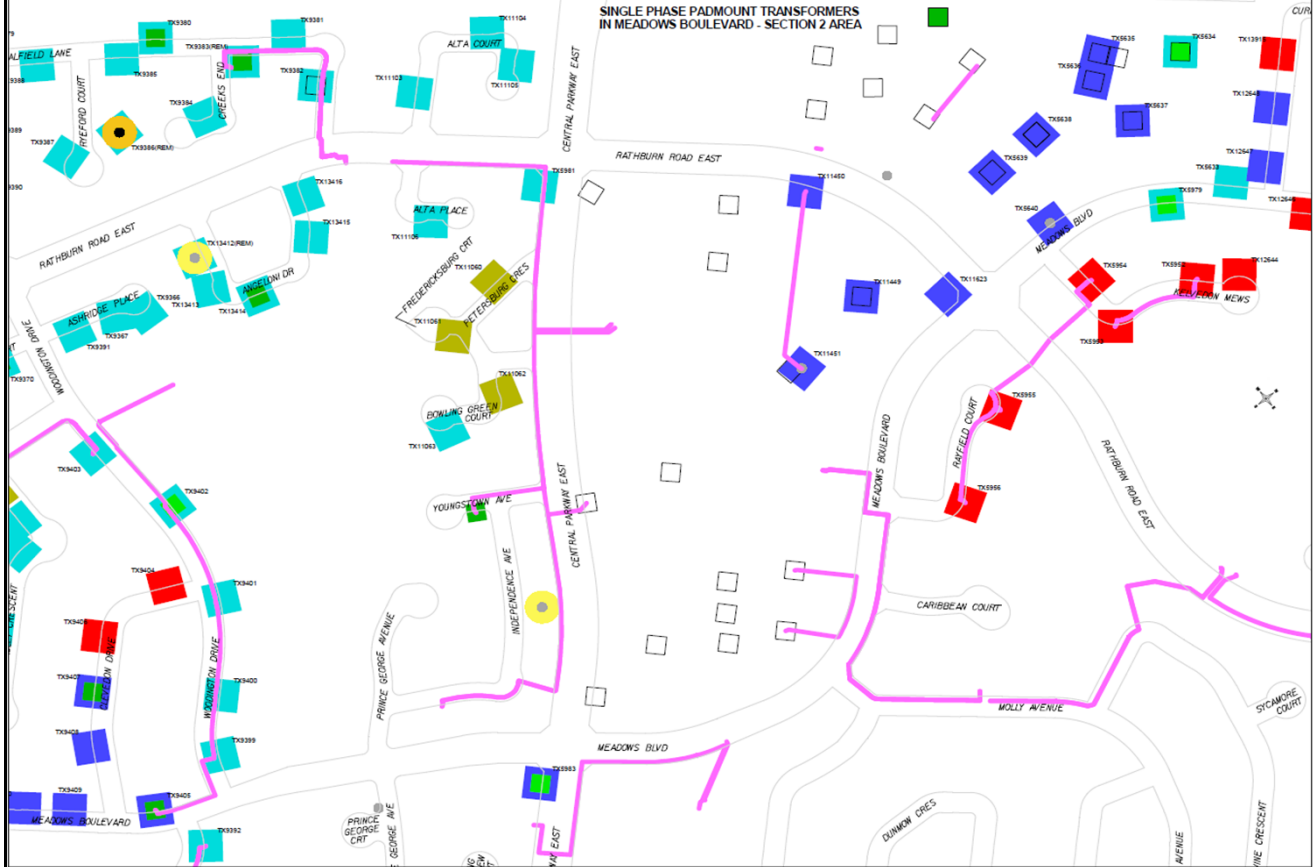
PROJECT SHEET	
PROJECT NAME:	Meadows - Section 2
PROGRAM NAME:	UNDERGROUND REBUILDS
BUSINESS UNIT:	C0505 - SUBDIVISION REBUILDS
SPONSOR:	PAUL SIDU
INITIATOR:	ALYKHAN PREMJI
BUSINESS CASE #:	2016-C0505

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The underground distribution equipment in the rebuild area are approximately 45 years old and have reached the “end of useful life”. To improve efficiency and reliability, as a work bundling initiative; the original transformers, switches, elbows and other distribution equipment will also be replaced since they were installed at the same time and have been determined to have reached the “end of their useful life”. This rebuild area contains transformers that are leaking, have PCB levels greater than 2 and are located in customers backyard which in some cases result in access issues by our field staff. Moreover, the distribution equipment in this area, especially underground cables, have faulted multiple times and are no longer able to provide reliable power to our customers. Furthermore, underground distribution equipment in this area were rated either poor or very poor by Kinectrics through the ACA. Project Cost: \$xxxxxxxx

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> • Underground primary cables are key component of the distribution power system and their failure causes outages that affect large number of customers • Pad mounted equipment are leaking and/or heavily rusted, hence they pose a safety hazard to the general public since the high voltage compartment can potentially be accessed • Several transformers contain PCB's, which will be removed from the system to avoid possible environmental spill or soil contamination • Some of the existing distribution equipment is installed in private backyards with limited access, making the maintenance and repair very difficult • Planned replacement of underground cables prevents power outages which improves reliability and lowers costs associated with power interruptions

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



Legend

Single Phase Padmount Transformers by Health Index

- Very Poor
- Poor

Single Phase Padmount Transformers by TX Location

- BACK

Single Phase Padmount Transformers by External Oil Leaking

- MAJOR
- MINOR
- MODERATE
- YES

Single Phase Padmount Transformers by PCB Level

- GREATER THAN 50 PPM
- LESS THAN 50 PPM

Worst Single Phase Padmount Transformers

- 1 to 200
- 200 to 400
- 400 to 600
- 600 to 800
- 800 to 1000
- 1000 to 1200

- Cable Faults
- A Street Names
- Street Lines



PROJECT BUSINESS CASE	
PROJECT NAME:	SUBTRANSMISSION RENEWAL
PROGRAM NAME:	2016-2021 SUBTRANSMISSION RENEWAL
BUSINESS UNIT:	C0562 - SUBTRANSMISSION RENEWAL
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
DEPARTMENTS INVOLVED:	ASSET OPERATIONS, ASSET MANAGEMENT, PURCHASING
DATE SUBMITTED:	FRIDAY, JULY 28, 2015
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0562-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Pole lines deteriorate over time, and when their strength is reduced to the point that there is a risk of failure under adverse weather conditions, they are deemed to be at the "end of useful life". During 2014-2015 period, Enersource inspected all its subtransmission poles. During the inspection, a number of poles were found to be in the "fair/poor" condition, which included rotting, mechanical damage, evidence of insects and pole cracking. In addition, the field inspections have identified a number of transformers with PCB greater than 2ppm installed on these poles and/or showing evidence of leaking. The overhead transformers with PCB will be removed in order to reduce the risk of environmental spill and/or soil contamination. Moreover, the projects were chosen to maintain reliable supply of power to the large and critical customers (e.g. airport, hospitals etc.). The projects were also selected to ensure that poles that were reaching end of its life cycle are being replaced. In addition, the insulators will be changed to polymer style, which will reduce the risk of pole fires. Furthermore the pole line will be upgraded to a current design and construction standards, in turn making it safer, more reliable and less susceptible to adverse weather conditions.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Overhead pole lines are a critical component of the subtransmission system and they must be replaced prior to failure. Poles that have been identified as in fair or poor condition along major roads are targeted as they pose the greatest risk for disruptions to customers. Pole lines that are at the end of their expected life need to be rebuilt to prevent any safety hazards to general public or Enersource's employees that may arise from pole line failure. Planned replacement of a pole line costs much less than emergency or reactive replacements and are less disruptive to customers. Replacement of these poles lines will also ensure that PCB transformers are replaced, minimizing the environmental risk or impact.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Operate with the current overhead pole line**

With this option, the pole line would eventually fail and would have to be repaired under emergency conditions, which is not economical when compared to scheduled construction. In addition, there is a great risk that a pole line failure could result in an unsafe situation or damages to private property, general public and critical customers. Some of the transformers contain PCB's so a pole line failure could also result in environmental spill and possibly soil contamination. Subtransmission pole lines have a greater risk associated with them as a failure in the subtransmission system often incurs the greatest number of customers to be without power.

OPTION 2: **Installation of underground feeder cables**

This option was evaluated, and because the underground system is approximately 6 to 10 times more expensive than the overhead system, it was determined to be too costly.

OPTION 3: **Renew proposed overhead lines**

This option ensures that overhead subtransmission feeders are replaced as the poles and associated distribution assets are reaching end of life. These subtransmission pole lines are critical to Enersource's ability to deliver safe and reliable power to a large number of customers.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Renewing proposed overhead lines is the most prudent and optimal solution as it ensures that aging overhead infrastructure is replaced prior to failure. Due to the fact that overhead subtransmission feeders feed large areas, it is critical that these assets are replaced in a timely manner. Operating with the current overhead pole line carries a higher likelihood of equipment failure and would result in worsening reliability performance. In addition, installation of underground feeder cables is a very costly alternative as it may cost 6 to 10 times to install compared to the overhead installation.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs
	<u>Support:</u> Replacing aging overhead equipment that minimizes the impact to the reliability, environment, customers and safety and thus leads to the improvement in ESQRs.	
	Customer Satisfaction	Does this project add Customer Value? 5 - Improves customer experience (a large user or 1000 RES customers)
	<u>Support:</u> Subtransmission feeders feed large number of customers, both residential and commercial & industrial) and the loss of supply due to equipment failure would result in deteriorating customer experience. Timely renewal of these assets ensures that future equipment failure due to degradation is being avoided/minimized.	
	Reputational Risk	Does this project reduce or eliminate a reputational risk? 10 - Prevents or significantly reduces likelihood of irreparable brand damage
	<u>Support:</u> By executing these projects, the risk of personal injury and environmental damage is being reduced and would not have a negative impact on Enersource's reputation.	

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 10 - Potential loss of life <u>Support:</u> Critical failure of the overhead system resulting in poles or equipment coming down carries a potential risk of loss of life or critical injury to general public and Enersource employees.
	Environmental Impact/risk This projects mitigates exposure that could cause: 8 - High environmental impact <u>Support:</u> Number of transformers with PCB greater than 2ppm installed on these poles and/or showing evidence of leaking. The overhead transformers with PCB will be removed in order to reduce the risk of environmental spill and/or soil contamination.
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> The overhead pole lines feed large number of residential, commercial and industrial customers which, in case of a failure, would result in a significant impact on our reliability metrics. For example, the Bloor-Cawthra to Tomken subtransmission line feeds over 5,000 customer. A single cable failure, with restoration time of 30 minutes, would result in over 100,000 customer minutes.
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Upgrading existing infrastructure but at the same time replacing with taller poles that can accommodate additional circuits that will help handle additional growth in the city.
	System Renewal This project is for replacement of distribution assets where: 8 - ACA health index "Poor" <u>Support:</u> The equipment identified for replacement in these projects are reaching the end of their useful life and require renewal. This includes poles, crossarms, insulators and cables.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? 1 year to 3 years
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? higher risk of equipment failure, including poles and overhead equipment coming down, thereby resulting in potential public injury or loss of life.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? n/a

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 3 - > \$30,000
	<u>Support:</u> Planned replacement of pole line costs much less than emergency or reactive replacements and are less disruptive to customers.	
	One-Time Costs	This project will incur/create one-time costs of: \$20.55M
	<u>Support:</u> 2016 - \$4.2M 2017 - \$3.0M 2018 - \$2.85M 2019 - \$3.15M 2020 - \$3.3M 2021 - \$4.05M	
	Ongoing Costs	This project will incur/create ongoing costs of:
	<u>Support:</u>	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 35 years What type of assets are being replaced? main feeders, poles, crossarms, insulators
		Anticipated Derecognition -

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 3 - > \$30,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$20.55M <i>Variance:</i> #VALUE! <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevents or significantly reduces likelihood of irreparable brand damage <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Potential loss of life <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - High environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - ACA health index "Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT SHEET	
PROJECT NAME:	Bloor - Cawthra to Tomken
PROGRAM NAME:	2016-2021 SUBTRANSMISSION RENEWAL
BUSINESS UNIT:	Select from drop-down menu
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	Provide reference to Program level business case

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of this project involves the rebuilding of 20 poles that were identified in the ACA as being fair or poor. BACKGROUND/PROBLEM/OPPORTUNITY • Overhead pole lines are a critical component of the distribution system and they must be replaced prior to failures since their failure may harm the general public or EHM employees • Sections of the pole line is near the end of its expected life and needs to be rebuilt to prevent any safety hazards that may arise from failure OPTIONS CONSIDERED The following options were considered for this project: • Operate with the current overhead pole line – With this option, the pole line would eventually fail and would have to be repaired under emergency conditions, which is not economical when compared to scheduled construction. In addition, there is a great risk that a pole line failure could result in an unsafe situation or damages to private property. Not proceeding with this project will result in lack in contingency. • Installation of underground feeder cables – This option was evaluated, and because the underground system is approximately 6 to 10 times more expensive than the overhead system, it was determined to be too costly

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Rebuild sections of the overhead pole line along Bloor Street and install new 44 kV and 13.8 kV feeders between Cawthra Road and Tomken Road. Impact of Deferral Not proceeding with this project would result in an increase in the risk of equipment failure under adverse conditions, leading to reduced reliability and safety hazards to the public and EHM personnel. In addition, not proceeding with this project will result in a lack in contingency in a case of equipment failure in the area. BENEFITS Based on the project type(s) selected, please describe the resulting benefits of this project. • Eliminate safety hazards to the public and utility personnel • Replace end of life assets Project Cost: \$600,000

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Lakeshore - Seneca to Cawthra
PROGRAM NAME:	2016-2021 SUBTRANSMISSION RENEWAL
BUSINESS UNIT:	Select from drop-down menu
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	Provide reference to Program level business case

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of this project involves the rebuilding of 23 poles that were identified in the ACA as being fair or poor. The Lakeview Water and Waste Water Treatment Plants are located in the vicinity of this work. The addition 16/27.6kV capacity to this area will be utilized to support the new load and contingency requirements. Many new water mains are in construction in the Region of Peel which means loading requirements from these plants will be increasing as additional pumps are added at the plants. The location of the Lakeview Generating Plant and the lands on the south side of Lakeshore Rd near the City of Toronto border are empty and large. These areas may develop in the future and these projects will add capacity to that area. The only 16/27.6 & 2.4/4.16kV east and west corridors from Hurontario St and Cawthra Rd in this area are limited to the above location. This is the only overhead corridor left where an additional 16/27.6kV link can be completed in this area. In addition, large section of the pole line needs to be replaced as 23 poles were identified in the ACA as being in poor condition and have construction with porcelain insulators. This will improve reliability in regards to insulator tracking and reduce the possibility of pole fires. BACKGROUND/PROBLEM/OPPORTUNITY • Overhead pole lines are a critical component of the distribution system and they must be replaced prior to failures since their failure may harm the general public or EHM employees • Sections of the pole line is near the end of its expected life and needs to be rebuilt to prevent any safety hazards that may arise from failure • Additional 27.6 kV capacity is required for Lakeview Water and Waste Water Treatment Plants • This link will be used to provide for better load balancing and contingency across the 27.6 kV and 4.16 kV in this area OPTIONS CONSIDERED The following options were considered for this project: • Operate with the current overhead pole line – With this option, the pole line would eventually fail and would have to be repaired under emergency conditions, which is not economical when compared to scheduled construction. In addition, there is a great risk that a pole line failure could result in an unsafe situation or damages to private property. Not proceeding with this project will result in lack in contingency, possible overloading of the 16/27.6 & 2.4/4.16kV overhead feeders. • Installation of underground feeder cables – This option was evaluated, and because the underground system is approximately 6 to 10 times more expensive than the overhead system, it was determined to be too costly

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Rebuild sections of the overhead pole line along Lakeshore Road East and install new 27.6 kV and 4.16 kV feeders between Seneca Avenue and Cawthra Road. Impact of Deferral Not proceeding with this project would result in an increase in the risk of equipment failure under adverse conditions, leading to reduced reliability and safety hazards to the public and EHM personnel. In addition, not proceeding with this project will result in the overloading of the 27.6 kV overhead feeders and lack in contingency in a case of equipment failure in the area. BENEFITS Based on the project type(s) selected, please describe the resulting benefits of this project. • Eliminate safety hazards to the public and utility personnel • Replace end of life assets • Create additional 27.6 kV and 4.16 kV feeder ties • Provide feeder capacity relief to meet future load growth in the area Project Cost: \$690,000

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Park - Hurontario to Kane
PROGRAM NAME:	2016-2021 SUBTRANSMISSION RENEWAL
BUSINESS UNIT:	Select from drop-down menu
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	Provide reference to Program level business case

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of this project involves the rebuilding of 32 poles as the condition of the old wood pole line along Park Street between Hurontario and Kane was identified by the ACA and recent pole inspection data as being in poor shape and the pole line hardware such as porcelain insulators and crossarms has reached the “end of useful life”. Additionally, the number of 16/27.6 & 2.4/4.16kV east and west corridors in the South end of the City that tie Lorne Park TS and Cooksville TS are limited to two, one in the Ontario Hydro ROW just north of the QEW which is full and the other one along Park St. This pole line is the only overhead corridor left where an additional 16/27.6kV link can be installed to allow for contingency system restoration. BACKGROUND/PROBLEM/OPPORTUNITY • Overhead pole lines are a critical component of the distribution system and they must be replaced prior to failures since their failure may harm the general public or EHM employees • This project will revitalize the existing pole line in this area and bring it to current construction and safety standards • The review of system capacity in the area concluded that additional 16/27.6 & 2.4/4.16kV capacity is required, based on EHM’s planning and design criteria of an average of 300A per main feeder and this project will allow for additional contingency in this area. • This link may be vital in a situation if a transformer is lost at Cooksville TS or Lorne Park TS since it will allow for load to be picked up from other feeders. OPTIONS CONSIDERED The following options were considered for this project: • Operate with the current overhead pole line – With this option, the pole line or the pole line hardware would eventually fail and would have to be repaired under emergency conditions, which is not economical when compared to scheduled construction. In addition, there is a great risk that a pole line failure could result in unsafe conditions or damages to private property • Relocation of circuits - Building another pole line on the city boulevards was reviewed, but the options were limited because of no other east and west roads to provide overhead links. In addition, that would not resolve the issues and risks associated with the old pole line along Park Street • Installation of underground feeder cables – This option was evaluated, and because the underground system is approximately 6 to 10 times more expensive than the overhead system, it was determined to be too costly

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Rebuild the old overhead pole line along Park Street from Hurontario to Kane Road Impact of Deferral Not proceeding with this project will result in a lack of TS ties, possible overloading of the 16/27.6 & 2.4/4.16kV overhead feeders in the area with an increased risk of lack of contingency and increased interruption to supply. BENEFITS Based on the project type(s) selected, please describe the resulting benefits of this project. • Creation of additional 2.4/4.16kV & 16/27.6kV feeder ties • Additional backup between Cooksville TS and Lorne Park TS • Provide feeder capacity relief and help balance feeder loading, reduce line losses • Additional supply capability to increase operating flexibility and to serve additional load • Eliminate safety hazards to the public and utility personnel Project Cost: \$960,000

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Queen - Briarwood to Seneca
PROGRAM NAME:	2016-2021 SUBTRANSMISSION RENEWAL
BUSINESS UNIT:	Select from drop-down menu
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	Provide reference to Program level business case

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of this project involves the rebuilding of 20 poles that were identified in the ACA as being fair or poor condition. In addition, this project includes replacement of overhead transformers (dating back to 1960's) with PCB content between 2 and 50 ppm and upgrading the pole line to a current design and construction standards (e.g. removal of wood cross arms construction, porcelain insulators), in turn making it safer, more reliable and less susceptible to adverse weather conditions. In addition, the old style pin-top insulators will be changed to polymer style, which will reduce the risk of pole fires. BACKGROUND/PROBLEM/OPPORTUNITY • Overhead pole lines are a critical component of the distribution system and they must be replaced prior to failures since their failure may harm the general public or EHM employees • This project will revitalize the existing pole line in this area and bring it to current construction and safety standards • This link may be vital in supplying feed to Briarwood MS which services the immediate area. OPTIONS CONSIDERED The following options were considered for this project: • Operate with the current overhead pole line – With this option, the pole line or the pole line hardware would eventually fail and would have to be repaired under emergency conditions, which is not economical when compared to scheduled construction. In addition, there is a great risk that a pole line failure could result in unsafe conditions or damages to private property • Installation of underground feeder cables – This option was evaluated, and because the underground system is approximately 6 to 10 times more expensive than the overhead system, it was determined to be too costly Project Cost: \$600,000

PROJECT BENEFITS / RISKS MITIGATED

Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.

Rebuild the old overhead pole line along Queen Street from Briarwood Avenue to Seneca Avenue.

Impact of Deferral

Not proceeding with this project will result in a lack of supply and feeder egress from to Briarwood MS, possible overloading of the 16/27.6 & 2.4/4.16kV overhead feeders in the area with an increased risk of lack of contingency and increased interruption to supply.

BENEFITS

Based on the project type(s) selected, please describe the resulting benefits of this project.

- removal of system hazards (porcelain insulators, wood cross arms, etc.)
- Provide feeder capacity relief and help balance feeder loading, reduce line losses
- Additional supply capability to increase operating flexibility and to serve additional load
- Eliminate safety hazards to the public and utility personnel

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT SHEET	
PROJECT NAME:	Goreway - Derry to City limits
PROGRAM NAME:	2016-2021 SUBTRANSMISSION RENEWAL
BUSINESS UNIT:	Select from drop-down menu
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	Provide reference to Program level business case

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> The scope of this project involves the rebuilding of 40 poles that were identified in the ACA as being fair or poor condition. In addition, this project includes replacement of overhead transformers (dating back to 1960's) with PCB content between 2 and 50 ppm and upgrading the pole line to a current design and construction standards (e.g. removal of wood cross arms construction, porcelain insulators), in turn making it safer, more reliable and less susceptible to adverse weather conditions. This section of feeder and poles has also been identified as critical in reliability as it services large customers and/or hospitals. In addition, the old style pin-top insulators will be changed to polymer style, which will reduce the risk of pole fires and is identified as one of the main links out of Woodbrige TS. BACKGROUND/PROBLEM/OPPORTUNITY - Overhead pole lines are a critical component of the distribution system and they must be replaced prior to failures since their failure may harm the general public or EHM employees - This project will revitalize the existing pole line in this area and bring it to current construction and safety standards OPTIONS CONSIDERED The following options were considered for this project: - Operate with the current overhead pole line – With this option, the pole line or the pole line hardware would eventually fail and would have to be repaired under emergency conditions, which is not economical when compared to scheduled construction. In addition, there is a great risk that a pole line failure could result in unsafe conditions or damages to private property - Installation of underground feeder cables – This option was evaluated, and because the underground system is approximately 6 to 10 times more expensive than the overhead system, it was determined to be too costly Project Cost: \$1,200,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Rebuild the old overhead pole line along Goreway Drive to the city limits. Impact of Deferral Not proceeding with this project will result in a lack of supply and feeder egress from to Woodbridge TS, possible overloading of the 44 & 13.8kV overhead feeders in the area with an increased risk of lack of contingency and increased interruption to supply. BENEFITS Based on the project type(s) selected, please describe the resulting benefits of this project. • removal of system hazards (porcelain insulators, wood cross arms, etc.) • Provide feeder capacity relief and help balance feeder loading, reduce line losses • Additional supply capability to increase operating flexibility and to serve additional load • Eliminate safety hazards to the public and utility personnel

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET

PROJECT NAME:	Stavebank MS - Feeder Egress
PROGRAM NAME:	2016-2021 SUBTRANSMISSION RENEWAL
BUSINESS UNIT:	Select from drop-down menu
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	Provide reference to Program level business case

PROJECT DESCRIPTION/SUMMARY

Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).

The scope of this project involves the replacement of 5 wood poles that were identified in the ACA as being fair or poor. These term poles have reached the end of their life and are critical in bringing feeders both in (27.6kV subtransmission feeder) and out (4.16kV distribution feeders) of Stavebank MS. Replacement of these poles will help maintain system reliability in the area. In addition, the old style pin top porcelain insulators and cross-arm construction will be removed and updated to the current standard, removing a cause of pole fires and increasing system reliability.

Project Cost: \$150,000

PROJECT BENEFITS / RISKS MITIGATED

Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.

Rebuild the old overhead pole line at the egress & ingress to Stavebank MS.

Impact of Deferral

Not proceeding with this project will expose Stavebank MS to risk of losing one or more 4.16kV feeders or possibly the loss of the 27.6kV subtransmission feed losing the entire station. This would result in possible overloading of the 27.6 & 4.16kV overhead feeders in the area with an increased risk of lack of contingency and increased interruption to supply.

BENEFITS

- Removal of system hazards (pin-top porcelain insulators, wood cross arms, etc.) and mitigating risk associated with the loss of an MS
- Provide feeder capacity relief and help balance feeder loading, reduce line losses
- Eliminate safety hazards to the public and utility personnel

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT BUSINESS CASE

PROJECT NAME:	Underground Transformer Replacement/ Overhaul
PROGRAM NAME:	Underground Transformer & Equipment Renewal
BUSINESS UNIT:	C0563 - U/G TRANSFORMER REPLACEMENT
SPONSOR:	Chris Hudson
INITIATOR:	Paul Sidhu
DEPARTMENTS INVOLVED:	Asset Operations Underground, Asset Management, Purchasing
DATE SUBMITTED:	September-02-15
DATE APPROVED:	
DATE STARTED:	January 1-2016
DATE COMPLETED:	December-31-16
BUSINESS CASE #:	2016-C0563-1

OEB CATEGORY FOR CAPITAL EXPENDITURES

	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY

Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).

The program is needed to allow for the planned and unplanned replacement of underground transformers that have failed, are in poor condition (i.e. leaking or rusting), or containing high PCB levels in various parts of the City.

Every year a number of transformers fail which results in outages to customers. Sometimes transformers are found to be severely leaking oil and require changing before they fail. Oil spills greater than 100 litres or PCB spills greater than 1 gram must be reported to the Region of Peel and depending on the severity also to the Ministry of Environment. A transformer failure in a residential area may only affect 6 to 12 customers so outage time is minimal. However a transformer failure for an industrial/commercial could prove costly to their business. Transformers are essential elements of the electrical distribution system and when they fail they must be immediately replaced.

There are about 20,000 underground transformers on the system. In 2014, under this program, approximately 483 underground transformers were replaced which were leaking badly and/or having PCBs or severely rusted. The 2016 budget will allow for the replacement of approximately 600 transformers.

Transformer condition is routinely assessed through our inspection program, as well as through operational personnel performing work such as switching and responding to trouble calls or outages. The outside crews advise the Underground Maintenance Supervisor or inform the Control Room of transformers that are in poor condition (typically leaking oil or rusting badly). When the Control Room receives the information, they generate a report and sent it to the Underground Maintenance Supervisor for follow-up. Outside employees who are on light duty from injury are also sometimes given sections of the City to visually inspect the condition of existing underground equipment. There is a large backlog of transformers that have been identified that need replacing.

High content PCB > 50ppm transformers, very poor, and severe leakers are being prioritized in 2015. These transformers must be replaced since they do not meet safety standards and will fail in the near future due to overheating. There is also a requirement from Environment Canada that all PCB transformers greater than 50ppm must be removed by 2025.

Single phase transformers for residential customers for most utilities are typically run to failure rather than replaced proactively due to their low cost and low customer minute impact.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Not proceeding with this program would mean there would be an increase in the risk of equipment failure under adverse conditions leading to reduced reliability. Planned or proactive spot replacement of transformers avoids reliability issues, emergency overtime labour costs and sometimes generators and is much less disruptive to customers than reactive replacements. It also mitigates potential environmental liabilities from leaking oil, replaces end of life assets, eliminates safety hazards to the public and utility personnel, improves reliability, power quality and safe operation of the underground equipment.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Remain status quo and not actively change out transformers that need replacing**

This is not a satisfactory option because the transformers will eventually fail if leaking, safety hazards will remain which will endanger personnel and the public, fines may be levied by government bodies from the leaking oil. Unplanned change outs are typically much more costly due to higher labour costs during emergencies, potential generator costs, and inconvenience to customers.

OPTION 2: **Continue to identify substandard transformers that need to be proactively replaced**

Proactively analyze inspection data and then continue do spot transformer replacements to ensure customers have good reliability. If a cluster of transformers are found in the same general area and the cables are also in poor shape then we can identify these areas for future underground subdivision rebuilds instead.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1: The recommendation is to continuously replace underground transformers identified through inspections and operational personnel. Vault transformer replacements will be concentrated on in 2016 as well as moderate leakers and PCB transformers. A comprehensive inspection was done on all vault tx's to determine their condition so they are being targeted. Vault transformers are in a separate locked room in a building so this work can be done effectively in the cold winter months and typically 3 single phase transformers get replaced all at the same time which better maximizes crew time and efficiency .

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Transformers that have leaked more than 100 litres or violated the PCB 1 gram rule must be reported to the Region of Peel and the MOE and require proactive change out and clean up to avoid fines.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 10 - Improvement from non-compliance to compliance <u>Support:</u> • Avoids fines from MOE • Maintain customer reliability with reduced outage duration and frequency • Replace end of life assets • Improve reliability, power quality and safe operation of the underground equipment
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> • Eliminates leaking transformers from customers houses
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Improves reliability and power quality for customers and makes us a good corporate citizen that is concerned about the environment

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 10 - Potential loss of life <u>Support:</u> Eliminate safety hazards to the public where there are holes in the live equipment that a person may get access or from utility personnel operating unsafe equipment.
	Environmental Impact/risk This projects mitigates exposure that could cause: 5 - Medium environmental impact <u>Support:</u> Oil leakage especially if PCB oil could be harmful to our reputation and fines can be levied.
	System Reliability This project maintains or improves system reliability: 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> Improve reliability, power quality and safe operation of the underground equipment
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Eliminates poor condition and old transformers from system.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> Per the ACA, underground transformers category, pad mounted transformers ranked very poor and poor were 6%, 3 phase transformers, 3% and vault transformners 10%. Transformer life is typically around 35 to 45 years. The average Health Index for this asset group was 89%, 92% and 89%.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year 2016
	What is the impact of deferring or not meeting the specified deadline date? High - System reliability will suffer, safety concerns will not be addressed and fines may be levelled from government bodies.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Possible new customer connections

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount			
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$4,125,000			
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: - Once transformer is replaced it will good for 35 to 50 years. Only need is for inspection every 3 years.			
	Impact on Distribution Rates / Revenue Requirement	<table style="width: 100%;"> <tr> <td style="width: 60%;"> What is the age of the assets being replaced? 35 years </td> <td style="width: 40%; text-align: right;"> Anticipated Derecognition </td> </tr> <tr> <td> What type of assets are being replaced? Transformers </td> <td style="text-align: right;"> </td> </tr> </table>	What is the age of the assets being replaced? 35 years	Anticipated Derecognition	What type of assets are being replaced? Transformers
What is the age of the assets being replaced? 35 years	Anticipated Derecognition				
What type of assets are being replaced? Transformers					

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$4,125,000 <i>Variance:</i> <u>(\$4,125,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu <i>Final Assessment:</i> Project required to become or remain compliant with applicable legislation and/or regulation <i>Initial Assessment:</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Improvement from non-compliance to compliance <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Potential loss of life <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED
Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



PROJECT BUSINESS CASE	
PROJECT NAME:	OVERHEAD TRANSFORMER REPLACEMENT AND EQUIPMENT RENEWAL
PROGRAM NAME:	OVERHEAD TRANSFORMER REPLACEMENT AND EQUIPMENT RENEWAL
BUSINESS UNIT:	C0564 - O/H TRANSFORMER REPLACEMENT
SPONSOR:	Chris Hudson
INITIATOR:	Branko Boras
DEPARTMENTS INVOLVED:	Asset Operations Overhead, Asset Management, Purchasing
DATE SUBMITTED:	September-02-15
DATE APPROVED:	
DATE STARTED:	January-01-16
DATE COMPLETED:	December-31-16
BUSINESS CASE #:	2016-C0564-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> The program is needed to allow for the planned and unplanned replacement of overhead transformers that have failed, are in poor condition i.e. leaking or rusting or containing high PCB levels in various parts of the City. Every year a number of transformers fail which results in outages to customers. Sometimes transformers are found to be severely leaking oil and require changing before they fail. Oil spills greater than 100 litres must be reported to the Region of Peel and depending on the severity also to the Ministry of Environment. A transformer failure in a residential area may only affect 10 to 12 customers so outage time is minimal. However a transformer failure for an industrial/commercial could prove costly to their business. Transformers are essential elements of the electrical distribution system and when they fail they must be immediately replaced. There are over 5,000 overhead transformers on the system. Transformer condition is routinely assessed by our inspection program, operational personnel performing work such as switching, responding to trouble calls or outages. The outside crews advise the Overhead Maintenance Supervisor directly or inform the Control Room of transformers that are in poor condition typically leaking oil or rusting badly. When the Control Room gets the information they generate a report and sent it to the Overhead Maintenance Supervisor for follow-up. Outside employees who are on light duty from injury are also sometimes given sections of the City to visually inspect the condition of existing overhead equipment. There is a large backlog of transformers that have been identified that need replacing. High content PCB tx's, very poor and severe leakers are being looked at in 2015. These transformers must be replaced since they do not meet safety standards and will fail in the near future due to overheating. There is also a MOE requirement that by 2015 all PCB transformers greater than 50ppm must be removed. Impact of deferral would be there would be an increase in the risk of equipment failure under adverse conditions, leading to reduced reliability and safety hazards to the public and EHM personnel. Possible fines from the MOE due to oil leakage. Per the Asset Condition Assessment under overhead transformers category, 2% of overhead transformers ranked very poor. This translates to approximately 100 overhead transformers.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Not proceeding with this program would mean there would be an increase in the risk of equipment failure under adverse conditions leading to reduced reliability. Planned or proactive spot replacement of transformers avoids reliability issues, emergency overtime labour costs and sometimes generators and is much less disruptive to customers than reactive replacements. Also it mitigates potential environmental liabilities from leaking oil, replaced end of life assets, eliminate safety hazards to the public and utility personnel, improve reliability, power quality and safe operation of the overhead equipment.

The recommendation is to continuously replace overhead transformers found through inspections.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Remain status quo and not actively change out transformers that need replacing.*

OPTION 2: *Continue to identify substandard transformers need to be proactively replaced to ensure reliability is maintained.*

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1:

This is not a satisfactory option because the transformers will eventually fail if leaking, safety hazards will remain which will endanger personnel and the public, fines may be levied by government bodies from the leaking oil. Unplanned change outs are typically much more costly.

Option 2:

Proactively analyze inspection data and then continue do spot transformer replacements to ensure customers have good reliability. If a cluster of transformers are found in the same general area and the cables are also in poor shape then we can identify these areas for future overhead rebuilds instead.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> Yes
	If project is mandatory, please select one of the following: Project required to become or remain compliant with applicable legislation and/or regulation
	If project is mandatory, can this project be deferred? Mandatory - Deferral of project will result in non-compliance with regulations.
	<u>Support:</u> Transformers that have leaked more than 100 litres or violated the PCB 1 gram rule must be reported to the Region of Peel and the MOE and require proactive change out and clean up to avoid fines.

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 10 - Improvement from non-compliance to compliance <u>Support:</u> • Avoids fines from MOE • Maintain customer reliability with reduced outage duration and frequency • Replace end of life assets • Improve reliability, power quality and safe operation of the overhead equipment
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> • Eliminates leaking transformers from customers houses
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Improves reliability and power quality for customers and makes us a good corporate citizen that is concerned about the environment

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 10 - Potential loss of life <u>Support:</u> Eliminate safety hazards to the public where there are holes in the live equipment that a person may get access or from utility personnel operating unsafe equipment.
	Environmental Impact/risk This projects mitigates exposure that could cause: 5 - Medium environmental impact <u>Support:</u> Oil leakage especially if PCB oil could be harmful to our reputation and fines can be levied.
	System Reliability This project maintains or improves system reliability: 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> Improve reliability, power quality and safe operation of the overhead equipment
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Eliminates poor condition and old transformers from system.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> Per the Asset Condition Assessment under overhead transformers category, 2% of overhead transformers ranked very poor. This translates to approximately 100 overhead transformers.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? 6 month to 1 year And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? High - System reliability will suffer, safety concerns will not be addressed and fines may be levelled from government bodies..
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Possible new customer connections

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$3,000,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: - Once transformer is replaced it will good for 35 to 50 years. Only need is for inspection every 3 years.	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 35 years	What type of assets are being replaced? Transformers

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$3,000,000 <i>Variance:</i> <u>(\$3,000,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu <i>Final Assessment:</i> Project required to become or remain compliant with applicable legislation and/or regulation <i>Initial Assessment:</i> <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Improvement from non-compliance to compliance <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Potential loss of life <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED
Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Pad Mounted Switchgear (PMH) Replacement Yearly Program
PROGRAM NAME:	UNDERGROUND MAINTENANCE
BUSINESS UNIT:	C0565 - U/G DISTRIBUTION MAINTENANCE
SPONSOR:	Chris Hudson
INITIATOR:	Paul Sidhu
DEPARTMENTS INVOLVED:	Asset Operations Underground, Asset Management, Purchasing
DATE SUBMITTED:	September-02-15
DATE APPROVED:	
DATE STARTED:	January 1-2016
DATE COMPLETED:	December-31-16
BUSINESS CASE #:	2016-C0565-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This yearly program is required to ensure the replacement of substandard PMH equipment that has failed, caused outages or has reached end of life. Underground distribution equipment deteriorates over time and must be replaced when reliability and safety risks reach unacceptable levels. Equipment condition is also assessed through our PMH inspection program, lineman doing switching for other work or crews working nearby. Flash overs in PMH units which cause reliability concerns are becoming more pronounced as the PMH units age. PMH units typically fail in foggy weather due to tracking inside the unit caused by the early morning dew and from contamination from road salt, especially near major road ways. Approximately 12 air insulated PMH units fail on a yearly basis. The life expectancy for a typical PMH unit is approximately 25 years Additionally, the contractor being used to clean PMH units using dry-ice cleaning to help prolong the PMH units life also inspects and recommends PMH replacements. PMH units can be dry ice cleaned more frequently to help lengthen their life but this is only effective for the medium term. Sometimes if an underground rebuild has been planned, certain PMH replacements can be delayed. Also in some cases, the PMH unit can be completely removed from service and the cables are then rerouted or connected directly to the nearby overhead system. The underground distribution system currently has 852 PMH units of varying types, voltages and condition. The approximately 200 PMH units on the 28kV system are being targeted for replacement as well as PMH units found in poor condition because they are a major reliability problem. These failures cause power disruptions to potentially hundreds to thousands of customers. Planned or proactive replacement of underground equipment avoids reliability issues, emergency overtime labour costs and sometimes generators and is much less disruptive to customers than reactive replacements. Solid dielectric PMH units are now typically being installed instead of air insulated units because these units will give 40 years or longer of equipment life and don't require to be dry ice cleaned every few years. Not proceeding with this program would mean there would be an increase in the risk of equipment failure under adverse conditions, leading to reduced reliability and safety hazards to the public and EHM personnel. Per the ACA PMH had less than 5% of units flagged for

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

From Enersource's reliability statistics, PMH failures have greatly contribute to decline in reliability over the past few years. The air insulated PMH failures are due mainly to contamination, old age, design configurations and application voltage levels. This results in power quality, reliability and maintenance issues. Each year Enersource have been replacing units due to premature failures, especially units on the 27.6kV system. These types of faults typically expose customers to multiple momentary power interruptions. This can take several days to troubleshoot and locate the faulty unit. As Enersource's system ages, this has the potential to become even more prevalent.

PMH units are essential elements of the electrical distribution system and when they become inoperable and reach end of life then complete replacement is required.

Approximately 50 of these units have been replaced with solid dielectric PMH units over the past 2 years. These units are expected to be more reliable and last longer approximately 40 years.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Remain status quo and not actively changing out PMH units and just run to failure*

Explanation

OPTION 2: *Continue with regular inspections to help identify substandard PMH units that need to be proactively replaced to ensure reliability is kept good and safety concerns are met.*

Explanation

OPTION 3:

Explanation

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1:

This is not a satisfactory option because the PMH units will continue to fail and cause safety and reliability concerns. As the PMH units get older they will fail more often and cause even more safety and reliability issues.

Option 2:

Inspection data and other sources of information should be used to proactively replace the poorest 30 PMH units on a yearly basis to ensure reliability and safety concerns are addressed.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> • Maintain customer reliability with reduced outage duration and frequency • Replace end of life assets • Improve reliability, power quality and safe operation of the underground equipment
	Customer Satisfaction Does this project add Customer Value? 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> • Improves reliability and power quality for customers
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Improves reliability and power quality for customers

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 10 - Potential loss of life <u>Support:</u> Eliminate safety hazards to the public where there are holes in the live equipment that a person may get access or from utility personnel operating unsafe equipment.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 5 - Prevent 50,000 customer minutes of outage <u>Support:</u> Improve reliability, power quality and safe operation of the underground equipment
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> PMH units allow more transformers to be connected to them.
	System Renewal This project is for replacement of distribution assets where: 5 - ACA health index "Fair" <u>Support:</u> Per the ACA there are 852 PMH units, average age was 19 years and approximately 32% of the population was 25 years or older. The average Health Index for this asset group was 79%. About 10% of the population was in "poor" or "very poor" condition.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? High - System reliability will suffer and safety concerns will not be addressed.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Possible new customer connections

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount
	<u>Support:</u> Eliminates need for ongoing dry ice cleaning	
	One-Time Costs	This project will incur/create one-time costs of: \$1,780,000
	<u>Support:</u> Comments...	
	Ongoing Costs	This project will incur/create ongoing costs of: \$200 per year
	<u>Support:</u> Inspections on a 2 year cycle and much later on possible dry ice cleaning	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 25 years
	What type of assets are being replaced? PMH unit	Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,780,000 <i>Variance:</i> (\$1,780,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$200 per year <i>Variance:</i> #VALUE! <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Improvement of multiple ESQRs Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Improves customer experience (a large user or 1000 RES customers) Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Helps preserve brand Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 10 - Potential loss of life Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - None Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 5 - Prevent 50,000 customer minutes of outage Support: Comments...
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 5 - Upgrade existing infrastructure to support existing service capacity Support: Comments...
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: 5 - ACA health index "Fair" Support: Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Key Stakeholder (if appropriate)

VP, Division

VP, Asset Management Strategy

Date

Date

Date

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Primary Distribution Equipment Replacement Yearly Program
PROGRAM NAME:	Underground Cable and Splice Replacements
BUSINESS UNIT:	C0565 - U/G DISTRIBUTION MAINTENANCE
SPONSOR:	Chris Hudson
INITIATOR:	Paul Sidhu
DEPARTMENTS INVOLVED:	Asset Operations Underground, Asset Management, Purchasing
DATE SUBMITTED:	September-02-15
DATE APPROVED:	
DATE STARTED:	January 1-2016
DATE COMPLETED:	December-31-16
BUSINESS CASE #:	2016-C0565-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This yearly program is required to ensure the spot replacement of individual substandard underground primary cables and splices that have failed repeatedly and caused numerous outages. Once a section of primary cable fails 3 or more times it is reviewed to see if it is cost effective to replace. Typically this is done by boring in a new section of cable or doing a short section of trenching and installing new cable. Underground primary cable deteriorates over time and must be replaced when reliability and safety risks reach unacceptable levels. When numerous primary cables fail in a concentrated area then a much larger underground rebuild is proposed instead involving replacing numerous cables and transformers and a subdivision rebuild is done. Approximately 140 primary cables fail on a yearly basis. The life expectancy for a typical primary cable is approximately 35 years. In some cases, the primary cable, instead of being replaced, can be completely removed from service or cables can be rerouted or connected directly to the nearby overhead system. There is over 2650km of primary cable on the system much of which is over 35 years old and direct buried. Primary cable failures are a major reliability problem and represent over 50% of outages. These failures cause power disruptions to potentially thousands of customers depending on the location of the section of cable. In most cases the problem cable can be isolated and power rerouted through other cables to pick up all of the affected customers. The section of faulty cable can then later be found, dug up and repaired. The majority of cable faults happen during the summer when the cables are heavily loaded from air conditioning demand. Planned or proactive spot replacement of underground cable avoids reliability issues, emergency overtime labour costs and sometimes generators and is much less disruptive to customers than reactive replacements. New cables are now of better quality and typically installed in 100mm PVC pipe so that they will last longer. Per the ACA, "over 10% of main feeder underground cables and over 20% of distribution underground cables were flagged for action. During the next 10 years, about 30% or higher of underground Cables (both main feeder and distribution lines) were determined to be eligible for replacement. It can be seen from the results that the Underground Cables category was, on average as an asset group, in the worst condition. There were 21% and 35% of the units in "poor" or "very poor"

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

From Enersource's reliability statistics, primary cable failures have greatly contributed to a decline in reliability over the past few years. The failures are due mainly to age, loading issues and application voltage levels. Cable failures result in reliability and maintenance issues. Each year, Enersource has replaced sections of cable to try and improve customer reliability. These types of faults typically expose customers to multiple momentary power interruptions and complete outages. This can take several hours to troubleshoot and locate the faulty cable section. As Enersource's system ages, this will become even more prevalent.

Primary cables are essential elements of the electrical distribution system and when they sustain multiple failures on a section of cable the cable is deemed unsuitable for repair because it has reached end of life. Complete replacement of the primary cable is required.

Approximately 5 to 10 sections of these cables are replaced yearly or reconfigured. Currently there are over 35 primary cables with 3 or more faults on them that need immediate replacement. The new cable installed will help to delay expensive subdivision rebuilds for at least 5 to 10 years depending on location and age.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Remain status quo and not actively change out primary cables.*

Repair/replace primary cables in a reactive manner. Up front costs are lower but long term costs are higher due to more rebuilds, lesser planning of jobs, higher overtime costs, and use of generators during emergencies. Reliability is more volatile.

OPTION 2: *Continue to identify substandard sections of cables that need to be proactively replaced*

Ensure reliability is maintained and delay subdivision rebuilds.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1:

This is not a satisfactory option because the primary cables will continue to fail and cause reliability concerns. Once a cable fails a number of times it will soon after fail again and cause another power outage.

Option 2:

Proactively analyze cable fault data and then do spot primary replacements to ensure customers have good reliability. If a cluster of primary cables are found in the same general area then instead identify these areas for future underground subdivision rebuilds.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Required – Deferral of project not recommended. Project required to proceed and will displace projects in future years.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> • Maintain customer reliability with reduced outage duration and frequency • Replace end of life assets • Improve reliability, power quality and safe operation of the underground equipment
	Customer Satisfaction Does this project add Customer Value? 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> • Improves reliability and power quality for customers
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Improves reliability and power quality for customers

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u> Eliminate safety hazards to the public where there are holes in the live equipment that a person may get access or from utility personnel operating unsafe equipment.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 5 - Prevent 50,000 customer minutes of outage <u>Support:</u> Improve reliability, power quality and safe operation of the underground equipment
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> New cables allow more load to be put through them so more customers can be connected to them.
	System Renewal This project is for replacement of distribution assets where: 5 - ACA health index "Fair" <u>Support:</u> Per the ACA there are 12% and 9% of main feeder cable is in poor and very poor condition. For distribution cables 22% and 13% are in very poor or poor condition. The average age of main feeder cables was 18 years and distribution cables was 21 years, Cable life is typically around 35 years. The average Health Index for this asset

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? High - System reliability will suffer and safety concerns will not be addressed.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Possible new customer connections

FINANCIAL SUMMARY

Financial Performance	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount	
	<u>Support:</u> Cable repairs are mitigated because the cable is replaced.		
	One-Time Costs	This project will incur/create one-time costs of: \$1,400,000	
	<u>Support:</u>		
Financial viability is maintained; and savings from operational effectiveness are sustainable.	Ongoing Costs	This project will incur/create ongoing costs of: -	
	<u>Support:</u> Once cable is replaced it will good for 35 to 50 years.		
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 35 years What type of assets are being replaced? Primary cables	Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,400,000 <i>Variance:</i> (\$1,400,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu <i>Final Assessment:</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Improvement of multiple ESQRs Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Improves customer experience (a large user or 1000 RES customers) Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 5 - Helps preserve brand Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No safety risk Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - None Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 5 - Prevent 50,000 customer minutes of outage Support: Comments...
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 5 - Upgrade existing infrastructure to support existing service capacity Support: Comments...
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: 5 - ACA health index "Fair" Support: Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Key Stakeholder (if appropriate)

VP, Division

VP, Asset Management Strategy

Date

Date

Date

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Underground Cable and Splice Replacements Yearly Program
PROGRAM NAME:	Underground Cable and Splice Replacements
BUSINESS UNIT:	C0565 - U/G DISTRIBUTION MAINTENANCE
SPONSOR:	Chris Hudson
INITIATOR:	Paul Sidhu
DEPARTMENTS INVOLVED:	Asset Operations Underground, Asset Management, Purchasing
DATE SUBMITTED:	September-02-15
DATE APPROVED:	
DATE STARTED:	January 1-2016
DATE COMPLETED:	December-31-16
BUSINESS CASE #:	2016-C0565-3

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This yearly program is required to ensure the spot replacement of individual substandard underground primary cables that have failed repeatedly or splices that have failed and caused numerous outages. Once a section of primary cable fails 3 or more times it is reviewed to see if it is cost effective to replace. Typically this is done by boring in a new section of cable or doing a short section of trenching and installing new cable. Underground primary cable deteriorates over time and must be replaced when reliability risks reach unacceptable levels. When numerous primary cables fail in a concentrated area then a much larger "subdivision rebuild" under a different business unit is done instead which involves replacing numerous cables and transformers. Approximately 140 primary cables and splices fail on a yearly basis. In some cases, the primary cable, instead of being replaced, can be completely removed from service or cables can be rerouted or connected directly to the nearby overhead system. There is approximately 6,271 km conductor-km of primary cable on the system much of which is over 35 years old, direct buried and near end of life. Primary cable failures are a major reliability problem and represent over 50% of outages. These failures cause power disruptions to potentially hundreds to thousands of customers depending on what section of cable has failed. In most cases the problem cable can be isolated and power rerouted through other cables to pick up all of the affected customers. Then the section of faulty cable can later be found by testing, dug up, repaired and retored. The majority of cable faults happen during the summer when the cables are heavily loaded from air conditioning demand. Planned or proactive spot replacement of underground cable avoids reliability issues, emergency overtime labour costs, potential generator costs and is much less disruptive to customers than reactive replacements.

New cables are now of better quality and typically installed in 100mm PVC pipe so that they will last longer, at least 45 years and the cables will be able to easier to replace.

Per the ACA, the Underground Cables category was found to be in the worst condition. The Underground Cables category was determined to have the highest flagged for action percentage among all the asset groups. At present, over 11% of main feeder and nearly 20% of distribution cables were flagged for action. Within the next 10 years, more than 30% of underground cable population is flagged for action. The life expectancy for a typical primary cable is approximately 35 years.

Not proceeding with this program would mean there would be an increase in the risk of equipment failure under adverse conditions leading to reduced reliability.

The recommendation is to continuously monitor and track primary cable reliability and then based on the number of faults, proactively do primary cable spot replacements where applicable.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

From Enersource's reliability statistics, primary cable failures have greatly contributed to a decline in reliability over the past few years. The failures are due mainly to age, loading issues and application voltage levels. Cable failures result in reliability and maintenance issues. Each year, Enersource replaces sections of cable to try and improve customer reliability. These types of faults typically expose customers to multiple momentary power interruptions and then complete outages. This can take several hours to troubleshoot and locate the faulty cable section. As Enersource's system ages, this will become even more prevalent.

Primary cables are essential elements of the electrical distribution system and when they sustain multiple failures on a section of cable repeatedly then the cable is deemed unsuitable for repair because it has reached end of life. Complete replacement of the primary cable is required.

Approximately 5 to 10 sections of these cables are replaced yearly or reconfigured. Currently, there are over 35 primary cables with 3 or more faults on them that need immediate replacement. The new cable installed will help to delay expensive subdivision rebuilds for at least 5 to 10 years depending on location and age.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: ***Remain status quo and not actively change out primary cables.***

Explanation: Repair/replace primary cables in a reactive manner. Up front costs are lower but long term costs are higher due to more rebuilds, lesser planning of jobs, higher overtime costs, and use of generators during emergencies. Reliability is more volatile.

OPTION 2: ***Continue to identify substandard sections of cables that need to be proactively replaced.***

Explanation: Ensure reliability is maintained and delay subdivision rebuilds.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1:

This is not a satisfactory option because the primary cables will continue to fail and cause reliability concerns. Once a cable fails a number of times it will soon after fail again and cause another power outage.

Option 2:

Proactively analyze cable fault data and then do spot primary replacements to ensure customers have good reliability. If a cluster of primary cables are found in the same general area then instead identify these areas for future underground subdivision rebuilds.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Required – Deferral of project not recommended. Project required to proceed and will displace projects in future years.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> Improves reliability and power quality for customers
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Improves reliability and power quality for customers

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 5 - Medical aid injury <u>Support:</u> Possible when closing in a fuse on fault that a lineman could be injured from fuses blowing which can be quite violent.
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 5 - Prevent 50,000 customer minutes of outage <u>Support:</u> Improve reliability, power quality and safe operation of the underground equipment
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> New cables allow more load to be put through them so more customers can be connected to them.
	System Renewal This project is for replacement of distribution assets where: 8 - ACA health index "Poor" <u>Support:</u> Per the ACA, the Underground Cables category was found to be in the worst condition. The Underground Cables category was determined to have the highest flagged for action percentage among all the asset groups. At present, over 11% of main feeder and nearly 20% of distribution cables were flagged for action. Within the next 10 years, more than 30% of underground cable population is flagged for action. The life expectancy for a typical primary cable is approximately 35 years.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? High - System reliability will suffer and safety concerns will not be addressed.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Possible new customer connections

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount
	<u>Support:</u> Cable repairs are mitigated because the cable is replaced.	
	One-Time Costs	This project will incur/create one-time costs of: \$1,400,000
	<u>Support:</u> Comments...	
	Ongoing Costs	This project will incur/create ongoing costs of: -
	<u>Support:</u> Once cable is replaced it will good for 35 to 50 years.	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 35 years What type of assets are being replaced? Primary cables
		Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date

PROJECT REVIEW - Complete at end of project									
Work Order(s):	<i>Please specify</i>								
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #ffcc00;"> <td style="width: 40%; padding: 5px;"> Cost Efficiencies <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> This project will save or avoid operational costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,400,000 <i>Variance:</i> (\$1,400,000) <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> This project will incur/create one-time costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> This project will incur/create ongoing costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> How much derecognition expense resulted from this project? </td> </tr> </table>	Cost Efficiencies <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...	This project will save or avoid operational costs of:	One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,400,000 <i>Variance:</i> (\$1,400,000) <u>Support/Explanation:</u> Comments...	This project will incur/create one-time costs of:	Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	This project will incur/create ongoing costs of:	Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	How much derecognition expense resulted from this project?
Cost Efficiencies <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...	This project will save or avoid operational costs of:								
One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,400,000 <i>Variance:</i> (\$1,400,000) <u>Support/Explanation:</u> Comments...	This project will incur/create one-time costs of:								
Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	This project will incur/create ongoing costs of:								
Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	How much derecognition expense resulted from this project? 								

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED			
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.			
Business Values	Performance Categories		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #f0d0d0;"> <td style="width: 40%; padding: 5px;"> <i>Final Assessment:</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments... </td> <td style="padding: 5px;"> If project is mandatory, please select one of the following: Select from drop-down menu </td> </tr> </table>	<i>Final Assessment:</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...	If project is mandatory, please select one of the following: Select from drop-down menu
<i>Final Assessment:</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...	If project is mandatory, please select one of the following: Select from drop-down menu		

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improves customer experience (a large user or 1000 RES customers) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medical aid injury <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Prevent 50,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - ACA health index "Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Primary Distribution Equipment Replacement Yearly Program
PROGRAM NAME:	Secondary Cable Replacements Yearly Program
BUSINESS UNIT:	C0565 - U/G DISTRIBUTION MAINTENANCE
SPONSOR:	Chris Hudson
INITIATOR:	Paul Sidhu
DEPARTMENTS INVOLVED:	Asset Operations Underground, Asset Management, Purchasing
DATE SUBMITTED:	September-02-15
DATE APPROVED:	
DATE STARTED:	January 1-2016
DATE COMPLETED:	December-31-16
BUSINESS CASE #:	2016-C0565-4

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
X	System Renewal
	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Enersource has over 160,000 secondary cables which are the low voltage cables (typically 347/600V or 120/208 for industrial/commercial and 120/240 for residential customers) that connect individual customers to a utility transformer. Typically all residential services are owned by the utility which has the responsibility to maintain and repair them. Over 200 of these residential services fail every year and to maintain service temporarily they are jumpered to the next door neighbour or jumpered in the meterbase 120 until repairs can be done, usually within a few days. Typically, the cable is dug up, a splice is done, the cable is repaired and restoration completed. In rare cases, the residential secondary cable must be fully replaced due to repeatedly failure. This work is then performed under this program. Similarly Enersource has over 20,000 industrial/ commercial customers and 5 to 10 or so fail on a yearly basis and are dug up, spliced and repaired. However, some require complete replacement due to repeated failure and this is done under this program. Typically when a industrial/ commercial service fails or needs to be replaced, a generator is required to be installed. This can be very costly but required because factories or businesses need to remain operational and often require continuous power 24 hours a day. Secondary cables are fairly localized and only typically affect one customer or a number of industrial units in a complex. This yearly program is required to ensure the spot replacement of individual substandard secondary cables that have failed repeatedly and caused numerous outages to typically one customer. Once a section of secondary cable fails 3 or more times or through Megger testing rates poorly it is fully replaced. Typically, this is done by installing a new section of secondary cable using the existing duct or trenching in a new section of cable. Approximately 5 to 15 secondary cables need to be completely replaced on a yearly basis. The life expectancy for a typical secondary cable is approximately 50 years. Secondary cables are not tracked separately in the ACA. Not proceeding with this program would mean that individual customers would be without power so there is no choice but to proceed with the work since generators are very costly. The recommendation is to continue with this program where applicable.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Secondary cables need to be immediately replaced if repairs are not feasible to ensure an individual customer has power. The failures are due mainly to age, loading issues and application voltage levels. This program is done on a yearly basis and as Enersource's system ages, this will become even more prevalent.

Secondary cables are essential elements of the electrical distribution system and when they sustain multiple failures then the secondary cable is deemed unsuitable for repair because it has reached end of life. Complete replacement of the cable is required and the only option.

Approximately 5 to 20 sections of these cables are replaced yearly.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Remain status quo and not actively change out end of life secondary cables.*

OPTION 2: *Continue to identify substandard sections of secondary cables and replace them to ensure customer reliability is maintained.*

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1:

This is not a satisfactory option because the secondary cables will continue to fail and cause reliability concerns. Once a cable fails a number of times it will soon after fail once again and cause another power outage to the customer and result in more costly repair work especially if a generator is involved.

Option 2:

Continue to do spot secondary cable replacements to ensure customers have good reliability. If a cluster of are found in the same general area then instead identify these areas for future underground subbdivision rebuilds.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Required – Deferral of project not recommended. Project required to proceed and will displace projects in future years.
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> • Maintain customer reliability with reduced outage duration and frequency • Replace end of life assets • Improve reliability, power quality and safe operation of the underground equipment
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> • Improves reliability and power quality for customers
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Improves reliability and power quality for customers

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 0 - No impact on customer minutes of outage <u>Support:</u> Improve reliability and power quality to the customer.
	System Expansion This project increases system capacity: 0 - No Impact on system capacity <u>Support:</u> New cables can possibly allow more load to be put through them so more customers can be connected to them.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> n/a

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: January-01-16
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? Low- only impacts individual customers
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? n/a

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount	
	<u>Support:</u> Cable repairs are mitigated because the cable is replaced.		
	One-Time Costs	This project will incur/create one-time costs of: \$95,000	
	<u>Support:</u> Comments...		
Ongoing Costs	This project will incur/create ongoing costs of: -		
<u>Support:</u> Once cable is replaced it will good for 35 to 50 years.			
Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 40 years	What type of assets are being replaced? Secondary cable	Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> 0 - No significant amount <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$95,000 <i>Variance:</i> (\$95,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu <i>Final Assessment:</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Makes an improvement or prevents degradation of 1 ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No Impact on system capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	U/G Installation of SCADA/Automation Switches
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0576 - PROTECTION AND CONTROL UPGRADES
SPONSOR:	JP Michaud
INITIATOR:	Rudy Wolf
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0576-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> A major trend in the utility industry is a move towards increased system automation and remote operation. In recent years Enersource has been steadily increasing the amount of automated load centers in the system with positive results. In particular, system reliability has improved with a decrease in outage duration. It is imperative that this move towards increased automation continues in order to ensure the continued improvement of the system. Many of the first generation load centers in Enersource's system were installed over 20 years ago. These load centers are of an older vintage and have been gradually losing their effectiveness in recent years. In particular, remote operations are not as reliable and many of these older load centers must be operated manually. At critical times during an outage, this leads to an increase in outage durations. Also, issues such as corrosion and tracking make the existing load centres a safety hazard for the field personnel as well as for the general public. Given these aging units, it is imperative that Enersource upgrade their system in order to avoid diminishing system reliability in the future. New G&W load centers use the latest technology (solid dielectric switchgears and bus bar design) and have proven to be reliable in terms of remote operability. For 2016, three locations have been targeted for load center replacement. These locations were chosen based on both the field condition and the location of the unit. A comprehensive automation study was completed to identify high priority areas. Factors such as historical reliability (momentary and sustained outages), customers affected and existing automation in the area were all considered in the study. The majority of the load centers in Enersource's system have been installed on the 27.6/16kV distribution system. The total cost of to upgrade five load centres, at the three different locations, (material and labor) will be approximately \$700,000 in 2016.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

- To continue increasing the footprint of automation within the system in order to improve system reliability and minimizing outage durations.
- To provide system operators/planners with increased flexibility during system upgrade projects and scheduled outages.
- To prevent the failure of aging equipment and the associated negative impact on system performance.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Proceed with the G&W Solid Dielectric Switchgear

Given Enersource's extensive experience working with G&W products as well as the ability to integrate G&W equipment to our existing 27.6/16kV distribution system and ability to integrate with SCADA, this option will result in increased system reliability and reduced outage durations. Also, the ability for the control room to quickly and remotely perform preventative actions will avoid catastrophic failures on the 27.6/16kV distribution system. Lastly, this option also provides the system operators to perform switching in a flexible and safer manner, during scheduled maintenance/projects as well as unplanned outages.

OPTION 2: Use equipment manufactured by a different vendor

Given Enersource's extensive experience working with G&W products as well as system and SCADA compatibility issues, switching to another vendor's product is not feasible or cost effective. Using a different vendor would require doing multiple pilot projects, re-training the field staff, as well as the need to keep another set of system spares in the event of equipment failure. In addition, due to the unique system voltage levels in Ontario, potential alternatives are limited and are often remotely located (US).

OPTION 3: Keep the existing equipment

Proceeding with the aging equipment would result in increased system failures and service interruptions. These increased failures would negatively impact system reliability and longer restoration times, which results in prolonged outages for customers.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

It was determined that the maximum system benefit would be achieved by continuing the installation of automated underground load centers on the 27.6/16kV distribution system as discussed in Option 1. Projects in 2016 will target locations that are deemed most critical (prioritization is based on the results of a comprehensive study).

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> U/G Installation of SCADA/Automation Switches can potentially assist in sectionalizing the outages caused by system faults, which leads to quicker power restoration for the customers.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Improved switching devices and RTU equipment supports system expansion.
	System Renewal This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor" <u>Support:</u> Existing equipment is in very poor condition and needs replacement.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? Not proceeding with this project would greatly increase the likelihood of failures of aging equipment. These increased failures would negatively impact system reliability and result in prolonged outages for customers.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Substation Upgrade projects rely on this project

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u> Comments...	This project will save or avoid operational costs of: 0 - No significant amount			
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$700,000			
	Ongoing Costs <u>Support:</u> Comments...	This project will incur/create ongoing costs of: -			
	Impact on Distribution Rates / Revenue Requirement	<table style="width: 100%;"> <tr> <td style="width: 60%;"> What is the age of the assets being replaced? 20 years </td> <td style="width: 40%; text-align: right;"> Anticipated Derecognition </td> </tr> <tr> <td> What type of assets are being replaced? U/G SCADA Switches </td> <td style="text-align: right;"> </td> </tr> </table>	What is the age of the assets being replaced? 20 years	Anticipated Derecognition	What type of assets are being replaced? U/G SCADA Switches
What is the age of the assets being replaced? 20 years	Anticipated Derecognition				
What type of assets are being replaced? U/G SCADA Switches					

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$700,000 <i>Variance:</i> <u>(\$700,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>Support:</u> Comments...	Does the project improve a Customer Service ESQR metric? Select from drop-down menu 0 - No impact on any ESQR
	Customer Satisfaction <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>Support:</u> Comments...	Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) 3 - Positive improvement to customer experience (non-quantifiable)
	Reputational Risk <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>Support:</u> Comments...	Does this project reduce or eliminate a reputational risk? Select from drop-down menu 0 - No brand impact

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>Support:</u> Comments...	This projects mitigates exposure that could cause: 0 - No safety risk 0 - No safety risk
	Environmental Impact/risk <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>Support:</u> Comments...	This projects mitigates exposure that could cause: 0 - None 0 - None
	System Reliability <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>Support:</u> Comments...	This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage 10 - Prevent 100,000 customer minutes of outage
	System Expansion <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>Support:</u> Comments...	This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk 10 - New infrastructure to avert major system constraint/risk
	System Renewal <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>Support:</u> Comments...	This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor" 10 - ACA health index "Very Poor"

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	O/H Installation of SCADA/Automation Switches
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0576 - PROTECTION AND CONTROL UPGRADES
SPONSOR:	JP Michaud
INITIATOR:	Rudy Wolf
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0576-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> A major trend in the utility industry is a move towards increased system automation and remote operation. In recent years Enersource has been steadily increasing the amount of automated switches in the system with positive results. In particular system reliability has improved with decreased outage duration. It is imperative that this move towards increased automation continues in order to ensure the continued improvement of the system. In 2014, the engineering department commenced a comprehensive system automation study with a purpose to prioritize each substation in terms of its potential impact and importance to the overall system. Factors such as historical reliability (momentary and sustained outages), customers affected and existing automation were all considered in the study. As a result of the study, several stations have been targeted as ideal candidates for project sites. Stations scheduled for automation upgrades in 2016 include Orr MS, McNiece MS and Grossbeak MS. A typical overhead automation project involves the installation of one or two automated switches in close proximity to a station. Such an arrangement allows for a station's incoming feed (subtransmission) to be quickly transferred to an alternative feed in the case of a fault. As such, station outage durations are greatly reduced and system reliability improved. On the 27.6kV system, Scada-Mate (S&C) switches are utilized. On the 44kV system, Alduti-Rupter (S&C) switches are utilized. Enersource has gained great expertise in working with these switches and as such can maximize their functionality even after installation. A total of 2 Scada-Mate switches (27.6kV) and 3 Alduti-Rupter switches (44kV) will be installed in 2016. The total cost of these projects (material and labor) is expected to be \$560,000. In addition, two existing automated switches will be retrofitted with upgraded Remote Terminal Units (RTUs). These upgrades will cost \$30,000. Also, acquisition and installation of two 27.6 kV automated Scada-Mate YL switches and one 44kV automated Alduti-Rupter LT switch will account for an additional \$190,000 in 2016. Initially, these project were to-be completed in 2015, but now, they are scheduled for 2016.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

- To continue increasing the footprint of automation within the system in order to improve system reliability while minimizing outage durations.
- To allow for the quick transference between incoming subtransmission feeds to a station.
- To provide system operators/planners with increased flexibility during system upgrade projects and scheduled outages.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Proceed with the S&C Scada-Mate and Alduti-Rupter**

The asset operations department has extensive experience working with S&C products. These products have been successfully integrated with Enersource's overhead distribution system and SCADA system. Another advantage of the S&C products is its close proximity to the City of Mississauga. S&C Engineers can be easily reached for product and technical support and troubleshooting. Several local utilities, including Toronto Hydro, also exclusively use S&C products for overhead automation taking advantage of their local support.

OPTION 2: **Using a different vendor**

This option is not cost effective because using a different vendor will require doing multiple pilot projects to assess overhead system and SCADA system feasibility. Further costs may include re-training the field/SCADA staff and the need to keep additional system spares. In addition, due to the unique system voltage levels in Ontario, potential alternatives are limited and are located further away from the City of Mississauga, which often makes it very hard to acquire technical and product support.

OPTION 3: **Keep the existing equipment**

Continuing to use of aged equipment, most of which are at the end of life, will result in reduced system reliability, longer outage times and not keeping up with the industry standards.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

It was determined that the maximum system benefit would be achieved by continuing the installation of automated overhead switches on both the 27.6kV and 44kV systems as discussed in Option 1. Projects in 2016 will target stations that are deemed most critical (prioritization is based on the results of a comprehensive study).

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Improved switching devices and RTU equipment supports system expansion.
	System Renewal This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor" <u>Support:</u> Existing equipment in very poor condition and needs replacement.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? Not proceeding with this project would greatly increase the likelihood of failures of aging equipment. These increased failures would negatively impact system reliability and result in prolonged outages for customers.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Substation Upgrade projects rely on this project

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$780,000	
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: -	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 20 years	Anticipated Derecognition
		What type of assets are being replaced? O/H SCADA Switches	

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

 Business Unit Manager / Division Director

 Date

 Key Stakeholder (if appropriate)

 Date

 VP, Division

 Date

 VP, Asset Management Strategy

 Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$780,000 <i>Variance:</i> <u>(\$780,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> 0 - No brand impact <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> 0 - No safety risk <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> 0 - None <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> 10 - New infrastructure to avert major system constraint/risk <i>Initial Assessment:</i> 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> 10 - ACA health index "Very Poor" <i>Initial Assessment:</i> 10 - ACA health index "Very Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Station RTU and Protection Relay Replacements
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0576 - PROTECTION AND CONTROL UPGRADES
SPONSOR:	JP Michaud
INITIATOR:	Rudy Wolf
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0576-3

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Enersource Hydro Mississauga has 66 substations throughout the City of Mississauga. In 2007, a plan was devised to upgrade the legacy S4T4 communication infrastructure at the substations to a more robust and IP based Multiprotocol Label Switching (MPLS) technology. MPLS technology provides multiple advantages over the legacy S4T4 technology such as the ability to remotely connect to the protection devices at the substation, active remote monitoring of the communication circuit health, advanced cyber security and possibility of connecting multiple services such as phone, internet and security cameras to the existing MPLS service. Under this project, the protection relays and the RTU at the substation will also be upgraded. The new microprocessor based protection relays and RTU are provided by General Electric. The microprocessor based relays and RTU provide several advantages over the mechanical relays and CAE RTU. The new RTU and relays have a much longer Mean Time To Failure (MTTF) and Mean Time Between Failures (MTBF). Some of the other advantages include lower cost, wider and continuous setting ranges, improved functionality and accuracy, high-speed tripping and availability of more information in the event of a system fault such as fault levels and oscillography. Also, in case of an equipment failure, the spare parts are quickly and readily available. These equipments are also IP based, which makes the substation automation scheme very reliable and remotely accessible through SCADA and Remote Desktop sessions. The following substations are scheduled for upgrades in 2016, under the Substation Rebuild Projects (Business Unit: C0504). 1. Mini Orlando MS 2. Orr MS 3. Rifle Range MS 4. Cawthra MS 5. Webb MS 6. RTU Protection Relay Upgrade (Grossbeak MS) The Station RTU and protection relay replacement projects will coincide with the Substation Rebuild projects, to minimize cost and system down time. As a result of completing the Station RTU and protection relay replacement projects, system reliability, communication downtime, and cyber security will improve. It will also enable the possibility of remotely connecting to the protection devices and monitoring any service interruptions at the substation.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

- Upgrading the communication infrastructure from the legacy S4T4 system to MPLS system
- Ability to remotely monitor the protection devices at the substation
- Improved cyber security
- Old CAE RTU and mechanical protection devices are nearing their estimated end-of-life cycle

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Use GE relays for protection and control with D25 as data concentrator*

For communication, MPLS technology will be used for communication between the data concentrator and the SCADA master. The existing S4T4 technology is prone to failures. A communication issue would lead to the Control Room losing the ability to monitor and control the devices at the substation and perform any switching activities. This would lead to longer outages as well as unsafe situations to the public and employees during storms or vehicle accidents. These technologies have gone through pilot testing and selected for the current program of equipment refurbishment. The staff is fully trained and very comfortable to work with the technology. Being able to respond in real time 24/7 is critical to the operation of EHM's distribution network.

OPTION 2: *Use alternative equipment - different relay and RTU makes, as well as other means of communication such as fibre or wireless*

EHM has standardized on GE relay and GE D25 data concentrator. Adopting other relays and data concentrator means a high start-up and training cost. For communication, fibre cost is prohibitive and wireless is not as stable as a land line. These technologies have gone through pilot testing and selected for the current program of equipment refurbishment. The staff is fully trained and very comfortable to work with the technology.

OPTION 3: *Keep the existing equipment*

The mostly mechanical relays and the CAE RTU's for the protection and control equipment are at end of life. The existing S4T4 communication system between the RTU and the SCADA master is slow and approaching obsolescence. Replacement parts are no longer available. It is necessary that this protection and control and communication equipment be replaced with the latest technology while the major substation equipment such as switchgears and transformers are being replaced. Not proceeding with this project would result in a decline in performance of the protection & control and communication circuit at the substations, as well as reduced system reliability leading to longer restoration times.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Replace the S4T4 communication technology with a more reliable and robust MPLS communication technology. Install new microprocessor based protection relays and substation RTU as described in Option 1.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Improved communication infrastructure, RTU, and relay equipment supports system expansion.
	System Renewal This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor" <u>Support:</u> Existing equipment in very poor condition and needs replacement.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? Not proceeding with this project would result in a decline in performance of the current communication circuit at the substations, as well as reduced system reliability and longer restoration times.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Substation Upgrade projects rely on this project

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$820,000
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: \$420,000 Costs that we have to pay Bell Canada to keep the MPLS connection available for our substations. Each connection is over \$550/month.
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 20 years What type of assets are being replaced? Station RTU and protection relays Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$820,000</u> <i>Variance:</i> <u>(\$820,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$420,000</u> <i>Variance:</i> <u>(\$420,000)</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on Customer Service Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No brand impact Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No safety risk Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - None Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 10 - Prevent 100,000 customer minutes of outage Support: Comments...
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 10 - New infrastructure to avert major system constraint/risk Support: Comments...
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: 10 - ACA health index "Very Poor" Support: Comments...

LESSONS LEARNED
Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



PROJECT BUSINESS CASE	
PROJECT NAME:	RTU System Enhancements
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0576 - PROTECTION AND CONTROL UPGRADES
SPONSOR:	JP Michaud
INITIATOR:	Rudy Wolf
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0576-4

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> The project will involve the purchase, installation, replacement and/or repair of the RTU main boards and related components for 65 stations and 240 SCADA switches. This is for the purpose of extending the useful life of these components that may fail prematurely or are now way beyond life expectancies. It will keep this part of the SCADA system in good operating order, which results in a more responsive SCADA system and improved reliability. This project is used for only maintenance and after-installation support purposes.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

There are stations and switches with equipment of the older technology which could be more than 20-25 years old. It has already been 12 years since the first upgrades to the newer technology. Equipment failure is likely to occur with normal wear and tear along with premature damage.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Update components to maintain equipment until a full change out is required**

Station and switch equipment replacement programs are already in place, but that would take a lot of time and resources to complete. Until the completion of those programs, it is the responsibility of Aseet Operations group to support, repair and upkeep of the existing and legacy equipment. Therefore, component updates such as board replacement is a quick and cost effective alternative to keeping the system working until complete change out can occur.

OPTION 2: **Status Quo**

Majority of the legacy equipment will be rendered non-operational and will be put out of service. This will result in a less reliable system with potential safety hazards.

OPTION 3: **Change out the existing equipment to other new technology**

This would require large capital expenditure and be time consuming. The program currently changes out equipment at the end of life which are prone to failure but an acceleration to replacement is not warranted.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Implement year round enhancement programs to meet condition-based requirements as well as initiate proactive measures to maintain operational upkeep as described in Option 1.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 3 - Prevent 30,000 customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Improved RTU equipment supports system expansion.
	System Renewal This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor" <u>Support:</u> Existing equipment in very poor condition and needs replacement.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? Not proceeding with this project would greatly increase the likelihood of failures of aging equipment. These increased failures would negatively impact system reliability and result in prolonged outages for customers.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed?

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u> Comments...	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$405,000	
	Ongoing Costs <u>Support:</u> Comments...	This project will incur/create ongoing costs of: -	
	Impact on Distribution Rates / Revenue Requirement		
What is the age of the assets being replaced? 20 years		What type of assets are being replaced? SCADA RTU Equipment	
		Anticipated Derecognition 	

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i></i> <i>Initial Assessment:</i> \$405,000 <i>Variance:</i> (\$405,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i></i> <i>Initial Assessment:</i> <i>-</i> <i>Variance:</i> <i>-</i> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <i>-</i> <i>Variance:</i> <i>-</i> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 3 - Positive improvement to customer experience (non-quantifiable) Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No brand impact Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No safety risk Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - None Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 3 - Prevent 30,000 customer minutes of outage Support: Comments...
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 10 - New infrastructure to avert major system constraint/risk Support: Comments...
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: 10 - ACA health index "Very Poor" Support: Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	SCADA Master Upgrade
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0576 - PROTECTION AND CONTROL UPGRADES
SPONSOR:	JP Michaud
INITIATOR:	Rudy Wolf
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0576-5

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> The Enersource Hydro Mississauga Power On Control SCADA (supervisory control and data acquisition) master system is a mission-critical system. It provides the system control operators with the ability to monitor and control the EHM electrical distribution grid. Specific SCADA subsystems, such as the SCADA radio system and software subsystems, require replacement or enhancements. These subsystems are a critical part of the SCADA Master operation and contribute to the reliable operation of the system.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

- Hardware failures pose a significant risk
- Difficult to find replacement parts for old hardware
- SCADA subsystem components form critical part of SCADA Master

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: Upgrade SCADA with existing vendor

Some hardware and software SCADA subsystem have reached end of life. In various cases it is not possible to find replacement hardware in a reliable fashion. Proceeding with a new generation of the GE PowerON Control System will result in minimum downtime, improved SCADA system reliability with reduced outage duration and frequency, improved cyber security measures and replacement of end of life assets. Furthermore, this upgrade will result in acquiring updated SCADA hardware and software components. Proceeding with the SCADA upgrade with the same vendor will also result in a quicker transition and reduced training time for the system operators.

OPTION 2: Upgrade SCADA with new vendor

Alternative SCADA systems, although possible, present a significant implementation risk. In various existing SCADA subsystems, a significant amount of customization has been implemented over the years. A significant amount of legacy field RTU's are present and work only with existing SCADA master front ends that are highly customized for EHM. Also, in order to support the IOM system connected to the SCADA system various specialized procedures and functions have been executed. New implementations would require significant resources, incur high costs, and present considerable technical challenges.

OPTION 3: Do not upgrade SCADA

Not proceeding with this project would result in a decline in SCADA system reliability due to increased unplanned outages from failed antiquated components. Should the existing SCADA system experience a hardware failure, it will be very difficult to find replacement hardware. Thus, the reliability of SCADA system would be compromised by both old hardware and software. EHM relies on the SCADA system during outage situations. A compromised SCADA system will result in delays to customer restorations.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1 provides Enersource with a sound, feasible, cost-effective and practically viable solution. This project encompasses the upgrade of not only Enersource's existing GENe software by GE, presently called PowerOn Control, but also an upgrade of the existing hardware and third party software infrastructure, as well as custom services to that new infrastructure, with minimal downtime and reduced training time for the system operators and other end-users.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves SCADA capabilities to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Improved SCADA subsystems supports system expansion.
	System Renewal This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor" <u>Support:</u> Existing equipment in very poor condition and needs replacement.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? Not proceeding with this project would greatly increase the likelihood of failures of SCADA subsystems. These increased failures would negatively impact system reliability and result in prolonged outages for customers.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed?

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount	
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$150,000	
	Ongoing Costs <u>Support:</u> SCADA modifications and upgrades or hardware replacements.	This project will incur/create ongoing costs of: \$125,000	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 10 years	What type of assets are being replaced? SCADA subsystems

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$150,000</u> <i>Variance:</i> <u>(\$150,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$125,000</u> <i>Variance:</i> <u>(\$125,000)</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - ACA health index "Very Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	WiMAX Wireless Network Project
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0576 - PROTECTION AND CONTROL UPGRADES
SPONSOR:	JP Michaud
INITIATOR:	Rudy Wolf
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0576-6

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> This study started in 2015. The scope for 2015 and 2016 is: 1. The deployment of WiMAX technology which includes, but not limited to, the following: • To investigate the effects of weather on data communication • To investigate the effects of data encryption on data rate • To study WiMAX communication, in the 1.8-GHz band, at longer ranges and real world terrain including tall buildings in Mississauga such as the Absolute World South building • To analyze the following parameters: signal strength, data rate, latency and reliability • To carry out optimization solution for Base Station with WiMAX application • To allow for the extension of multi-megabit Ethernet connectivity over large geographical areas for future applications • To carry out WiMAX testing within Enersource geographical locations (to be agreed upon by all Parties using equipment supplied by Siemens) • To map, simulate, and define WiMAX optimum station locations and antenna heights • To verify simulation results with field testing. 2. The development of applications which may include, but are not limited to, the following: • To retrieve power quality data (kW, kVar, Volt, Amp, Hz, disturbances and harmonics) from remote locations • To access to remote terminal units • To access to P&C relay configuration and status data • To monitor faults from digital, fault and/or disturbance fault recorder data. • Mobile workforce device communications (tablet, laptop, GPS w/ database access) • Voice mobile (in vehicle and handheld) radio applications • To configure a managed network to prioritize traffic, i.e. Real time SCADA information to have higher priority over downloading data Beyond the above pilot study, Enersource intends to deploy the WiMAX network and integrate the existing SCADA technology currently on the MDS wireless network as well as fault indicators, inspection tablets, voice radios and other smart grid applications.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

- An opportunity for Enersource to become a regional leader in WiMAX technology
- This project would give us a de facto regional reservation on important parts of the available bandwidth

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Continue with our existing MDS Radio system*

his option was evaluated, and because the MDS radio system is aging, an alternative option needs to be explored that will address improved radio coverage, network security, data rates, and communication reliability.

OPTION 2: *Continue to test and research in the field of WiMAX communication to determine suitability for Enersource's communication needs*

The test pilot will ensure that bandwidth coverage and communication parameters such as latency and various equipment compatibility is fully understood before large capital money is spent. The program over the multiple years will enable integration of RTU's, fault indicators, mobile networks and other smart grid applications.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Continue to conduct the WiMAX study and deploy the network to integrate RTU's, fault indicators, smart metering and various future smart grid applications as described in Option 2. Not proceeding with this project would result in a significant amount of risk in relying on an aging radio network. Enersource would lose the ability to develop various future smart grid applications. This would be a missed opportunity to be at the forefront of technology and innovation. There are six frequency bands currently reserved for electric utility. A utility interested in this the WiMAX technology would have to apply on a first come first serve basis. Once a frequency band is given to a utility, it would not be available to a neighbouring utility. Therefore, it is important that Enersource do the study early and apply for the frequency.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u>
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves SCADA capabilities to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Improved SCADA subsystems supports system expansion.
	System Renewal This project is for replacement of distribution assets where: 5 - ACA health index "Fair" <u>Support:</u> Existing equipment in fair condition and needs replacement.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? Not proceeding with this project would greatly increase the likelihood of failures of SCADA subsystems. These increased failures would negatively impact system reliability and result in prolonged outages for customers.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed?

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u> Comments...	This project will save or avoid operational costs of: 0 - No significant amount			
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$220,000			
	Ongoing Costs <u>Support:</u> Comments...	This project will incur/create ongoing costs of: -			
	Impact on Distribution Rates / Revenue Requirement	<table style="width: 100%;"> <tr> <td style="width: 60%;"> What is the age of the assets being replaced? 10 years </td> <td style="width: 40%; text-align: right;"> Anticipated Derecognition </td> </tr> <tr> <td> What type of assets are being replaced? SCADA subsystems </td> <td style="text-align: right;"> </td> </tr> </table>	What is the age of the assets being replaced? 10 years	Anticipated Derecognition	What type of assets are being replaced? SCADA subsystems
What is the age of the assets being replaced? 10 years	Anticipated Derecognition				
What type of assets are being replaced? SCADA subsystems					

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>\$220,000</u> <i>Variance:</i> <u>(\$220,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on Customer Service Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No brand impact Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No safety risk Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - None Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 10 - Prevent 100,000 customer minutes of outage Support: Comments...
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 10 - New infrastructure to avert major system constraint/risk Support: Comments...
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: 5 - ACA health index "Fair" Support: Comments...

LESSONS LEARNED
Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Mini-Orlando Substation (44kV - 27.6 kV)
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0504 - SUBSTATION CONSTRUCTION
SPONSOR:	JP Michaud
INITIATOR:	Doru Voicu
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0504-1

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Based on the existing summer feeder loading, System Planning load forecast and enquiries from developers in the area, additional 27.6kV capacity is urgently needed in the area. To address the capacity demand in the area a new substation needs to be built along Mavis Road, South of 401 Highway. This project is a growth driven investment. The new substation will add approximately 40 MVA of capacity on the 27.6 North system by the end of 2016 and the project scope includes the following work: • 2015 - o Acquisition of one (1) 20 MVA on-load power transformer; - o Acquisition of one (1) high voltage 46 kV switchgear; - o Acquisition of one (1) low voltage 35 kV solid dielectric switchgear (operated at 27.6 kV) • 2016 - o Acquisition of one (1) 20 MVA on-load power transformer; - o Acquisition of one (1) high voltage 46 kV switchgear; - o Acquisition of one (1) low voltage 35 kV solid dielectric switchgear (operated at 27.6 kV) At completion, the substation will house two power transformers, two (2) high voltage switchgears and two (2) low voltage switchgears, which will deliver power via four (4) 27.6 kV feeders.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The construction of the Mini-Orlando Distribution Station (DS) is a capacity and customer driven investment. The project implementation is required by the System Planning Department to address the current feeder loading issues. Currently the 27.6kV feeders in the Heartland area are above the optimal capacity during the summer months and in the case of an equipment failure, there is no source of a backup in the area. Also, the Orlando Corporation has approached Enersource and provided a plan for the remaining undeveloped land in the area. In order for Enersource to be able to supply the future development, as shown in the Appendix, an additional 27.6kV capacity in the area is necessary.

In addition, during the Regional Planning effort with Hydro One and participating utilities, including Enersource, it was determined that Erindale TS T1/T2 DESN, and the 27.6kV transformer station is expected to be overloaded in the near future above the 10-day LTR limit during summer peaks. The peak load at Erindale TS T1/T2 DESN has reached the DESN's capacity, and is expected to exceed it by as much as 40 MW by 2023. In addition, Enersource's feeder capacity is at its limit at Erindale TS, since it also considers the feeder and pole line contingency of N-1. Therefore, it has been concluded that the capacity needs at Erindale TS T1/T2 should be addressed by an additional transformation in the Heartland area.

The Mini-Orlando Substation will temporarily address the future growth in the area and offload the Erindale TS T1/T2 DESN until a new permanent 27.6kV capacity is added in the area of Hwy 407 and Mavis.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: New DESN – Transfer some existing 27.6 kV load from Erindale TS to a new DESN

- Since the existing 27.6kV feeders at Erindale are already fully loaded and the existing capacity is needed to maintain the N-1 contingency, the capacity transfer from Erindale is not feasible.

OPTION 2: Load transfer – Transfer some existing 27.6 kV load from Erindale TS to Cooksville TS

- Cooksville TS is separated from Erindale T1/T2 by a 44 kV service area. It would be operationally challenging and expensive to run a new 27.6 kV feeder through the 44 kV service territory.

OPTION 3: Build a new DS to utilize extra 44 kV system capacity

- Currently there is extra capacity available on the 44 kV system that can be temporarily transferred onto the 27.6kV system by building a step down (44/27.6 kV) DS. This new station will be supplied from two 44kV feeders. Enersource has experience with this type of substation since the first 44/27.6 kV station was commissioned in 2002. The power transformers and the high voltage switchgear units are similar to the units installed in 2002. The solution chosen for a low voltage switchgear E-House will provide more switching flexibility and increase the system reliability.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 3 is the most efficient and suitable option that will address the immediate need for the new capacity in the Heartland area. This solution will involve the planning and construction of a new DS by Enersource. Considering the cost (which is a considerably lower cost than the construction of a North-South System tie or a new Transformer Station), reliability and standardization of the major power equipment; Enersource has chosen the most viable option.

In addition, a comprehensive study by the Regional Planning group in and Hydro One will be needed to determine a permanent Transformer Station location and size to address the 27.6kV capacity in the area north of Britannia and west of Hurontario.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage
	<u>Support:</u>	Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion	This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk
	<u>Support:</u>	The new substation will reduce over-capacity loading at Erindale TS T1 &T2 while balancing the loading capability on 44 kV system via Churchill Meadows TS.
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 2016
	Urgency of implementation? 1 year to 3 years
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? High- the capacity constraints for Erindale TS would not be addressed.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Additional load in the Heartland area would be impacted due to capacity constraints.

FINANCIAL SUMMARY

Financial Performance	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount
	<u>Support:</u>	
	One-Time Costs	This project will incur/create one-time costs of: \$4,450,000
	<u>Support:</u>	2015 - \$1.6M; 2016 - \$2.85M;
	Ongoing Costs	This project will incur/create ongoing costs of: \$36,000
Financial viability is maintained; and savings from operational effectiveness are sustainable.	<u>Support:</u>	This is a yearly operating cost consisting of maintenance, inspection, Grounds & Building upkeep and property taxes.
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu
		What type of assets are being replaced? Please specify
		Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): Please specify	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$4,450,000 <i>Initial Assessment:</i> \$4,450,000 <i>Variance:</i> (\$4,450,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> \$36,000 <i>Initial Assessment:</i> \$36,000 <i>Variance:</i> (\$36,000) <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu <i>Final Assessment:</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? Select from drop-down menu <i>Final Assessment:</i> <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Select from drop-down menu <i>Final Assessment:</i> <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...	This projects mitigates exposure that could cause:
	Environmental Impact/risk <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...	This projects mitigates exposure that could cause:
	System Reliability <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...	This project maintains or improves system reliability:
	System Expansion <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Comments...	This project increases system capacity:
	System Renewal <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...	This project is for replacement of distribution assets where:

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Orr MS
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0504 - SUBSTATION CONSTRUCTION
SPONSOR:	JP Michaud
INITIATOR:	Doru Voicu
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0504-2

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Among the list of critical equipment in Enersource's Asset Condition Assessment, substation equipment was identified as the second most significant to the sustainability of the organization. Therefore, it is imperative that such equipment is replaced before a failure occurs which could have negative impact on Enersource's customer as well as its reputation. The major power equipment installed at Orr MS consists of one low voltage switchgear line-up (LV), one 5 MVA power transformer and one metal enclosed high voltage switchgear. The switchgear line-ups and the power transformers were manufactured as follows: •LV switchgear – 1974 •Tx1 transformer – 1974 •HV switchgear - 1974 The switchgear units and the power transformers are beyond the expected end of life of 40 years. The transformer tap changer is defective and it cannot be operated. The project consists of replacing the LV switchgear line-up, the power transformer and the high voltage switchgear. The existing HV switchgear is equipped with fuse protection. The HV replaced switchgear will be equipped with house a circuit breaker complete with a relay in order to provide enhanced the new transformer protection. The HV breaker with the relay will provide transformer differential protection as well as overcurrent protection. At present a substandard method of protecting our critical power transformers with fuses is utilized.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The LV switchgear line-up at Orr MS is housing magnetic air circuit breakers. It is the substation department intent to replace all switchgear units housing magnetic air circuit breakers by 2023 with modern circuit breakers equipment.

The main reasons of replacing the switchgear are as follows:

- Increasing failure rates of magnetic air circuit breakers (two failures in the past 12 months)
- Scarcity of spare parts (many spare parts are now obsolete)
- Elimination of arc chutes that may contain asbestos
- Replacing the old magnetic circuit breaker technology with magnetic actuator technology
- Reduce the operating cost by increasing the maintenance interval from 3-4 years to 5 years and reducing the time required to maintain the circuit breakers
- Enhance the safety of our crews performing switching at the substation
- Eliminate / replace the existing switching units housed inside the substation

The Tx1 power transformer is 42 years old. The life of a transformer depends on the life of the insulation system. The solid insulation (cellulose papers) degrades with age. The amount of degradation is mainly due to operating temperature, presence of air and/or water, product decomposition, and oxidation dissolved in the insulating oil. It is good utility practice to replace the substations power transformers before they fail.

A power transformer failure at Orr MS may affect over 1,000 customers, which may subject customers to a prolonged outage. Also there are high environmental and financial risks due to the possible oil spills and the subsequent cleaning which could cost at least \$150k.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

Replacing the existing switchgear units with new ABB arc resistant switchgear; replacing the existing transformer with new 5MVA transformer

New equipment will significantly reduce failure rates and subsequent outage costs to Enersource and its customers.

OPTION 2:

Retrofitting the circuit breakers; Replacing the existing transformer with a spare unit

A pilot project consisting of retrofitting the circuit breakers was performed in 2006 at Rockwood MS. Based on the post-project analysis, it was concluded that faced with similar equipment vintage and issues, Enersource should replace the entire switchgear line-up. The main disadvantages of retrofitting the switchgear are as follows:

- Replacing the circuit breakers does not enhance the crew safety since the switchgear is still not arc resistant;
- The switchgear is still an outdated unit since the control wiring, current and potential transformers have not been replaced
- It does not represent a long term solution for upgrading and improving the system reliability.
- The cost savings associated with breakers retrofit has not materialized due to the labor cost to upgrade the control wiring

Replacing the existing Tx1 transformer with a spare unit will represent a short term solution since our two 5 MVA spare transformers were manufactured in 1968 and 1969.

OPTION 3:

Do not replace / retrofit the power equipment.

An equipment failure will have a negative impact on Enersource's customers and its reputation. The system reliability will be affected and restoration of the system to normal conditions will take 8-10 months since the switchgear and power transformer both have long lead time times.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 1

Replace the existing switchgear with new ABB arc resistant switchgear; the option to retrofit the circuit breakers was not adopted due to the reasons listed above.

Replace the Tx1 transformer with a new 5 MVA transformer; the option to use spare transformers was not adopted due to the reasons above.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 5 - Medium environmental impact <u>Support:</u> Leaking oil from a substation transformer could require remediation of the soil on site.
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> The new equipment will reduce the failure rates and improve the system reliability.
	System Renewal This project is for replacement of distribution assets where: 5 - ACA health index "Fair" <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? A failure of a power transformer or circuit breaker may result in a prolonged outage to our customers which would negatively impact system reliability. There may also be a high cost associated with environmental clean up if the power transformer suffers a catastrophic failure.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 10 - > \$100,000
	<u>Support:</u> Replacing transformers mitigates the potential for clean up of leaking oil and the resulting soil remediation. Costs would be expected to exceed \$150K.	
	One-Time Costs	This project will incur/create one-time costs of: \$1,500,000
	<u>Support:</u>	
	Ongoing Costs	This project will incur/create ongoing costs of: -
	<u>Support:</u>	
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 42 years What type of assets are being replaced? Power Transformer & Switchgear Units
		Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

FEEDER	SUBSTATION_NAME	VOLTAGE	TS_FEEDER	TS_VOLTAGE	NUM_CUSTOMERS	NUM_TRANSFORMERS
22F1	ORR	4.16	67M3	27.6	313	47
22F2	ORR	4.16	67M3	27.6	298	49
22F3	ORR	4.16	67M3	27.6	224	36
22F4	ORR	4.16	67M3	27.6	250	21

PROJECT APPROVALS

 Business Unit Manager / Division Director

 Date

 Key Stakeholder (if appropriate)

 Date

 VP, Division

 Date

 VP, Asset Management Strategy

 Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 10 - > \$100,000 <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$1,500,000 <i>Variance:</i> <u>(\$1,500,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medium environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - ACA health index "Fair" <u>Support:</u> Comments...

LESSONS LEARNED
Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Rifle Range MS
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0504 - SUBSTATION CONSTRUCTION
SPONSOR:	JP Michaud
INITIATOR:	Doru Voicu
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0504-3

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Among the list of critical equipment in Enersource's Asset Condition Assessment, substation equipment was identified as the second most significant to the sustainability of the organization. Therefore, it is imperative that such equipment is replaced before a failure occurs which could have negative impact on Enersource's customer as well as its reputation. The major power equipment installed at Rifle Range MS consists of two low voltage switchgear line-ups (LV1 and LV2), two 5 MVA power transformers (Tx1 and Tx2) and two metal-enclosed high voltage switchgears (HV1 and HV2). The switchgear line-ups and the power transformers were manufactured as follows: •LV1 switchgear – 1968 •Tx1 Transformer – 1969 •HV1 Switchgear – N/A (assumed to be 1968 or 1969) •LV2 switchgear – 1968 •Tx2 Transformer – 1969 •HV2 Switchgear - N/A (assumed to be 1968 or 1969) The equipment is well beyond the design life time of 40 years. The power transformers and the switchgear units need major refurbishment and considering their ages this investment is not justified. The project consists of replacing all the all major substation equipment mentioned above.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The switchgear line-ups at Rifle Range MS are housing magnetic air circuit breakers. The substation department plans to replace all switchgear units housing magnetic air circuit breakers by 2023 with modern vacuum circuit breakers.

The main reasons of for replacing the switchgear are as follows:

- Increasing failure rates of magnetic air circuit breakers
- Scarcity of spare parts (many spare parts are now obsolete);
- Elimination of arc chutes that may contain asbestos
- Replacing the old magnetic circuit breaker technology with magnetic actuator technology
- Reduce the operating cost by increasing the time between maintenance interval from three or– four years to five years and reducing the time required to maintain the circuit breakers
- Enhance the safety of our crews performing switching at the substation

The Tx1 power transformer is 46 years old. The life of a transformer depends on the life of the insulation system. The solid insulation (cellulose papers) will degrade with age. The amount of degradation is a function of operating temperature, presence of air and / or water product decomposition and oxidation dissolved in the insulating oil. It is good utility practice to replace the substation power transformers before they fail.

A main breaker or transformer failure at Rifle Range MS may affect over 1,700 customers, which may subject the customers to a prolonged outage.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1:

Replacing the existing switchgear units with new ABB arc resistant switchgear; replacing the existing transformer with new 5MVA transformer

New equipment will significantly reduce failure rates and subsequent outage costs to Enersource and its customers.

OPTION 2:

Replacing the existing Tx1 transformer with a spare unit

This will represent a short term solution since our two 5 MVA spare transformers are manufactured in 1968 and 1969 and will not provide the longevity required.

OPTION 3:

Do not replace / retrofit the power equipment.

An equipment failure will have a negative impact on Enersource's customers and its reputation. The system reliability will be affected and restoration of the system to normal conditions will take 8-10 months since the switchgear and power transformer both have long lead time times.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Replace the existing switchgear with new ABB arc resistant switchgear. The option to retrofit the circuit breakers was not adopted due to the reasons listed above.

Replace the transformers with new 5 MVA transformers. The option to use spare transformers was not adopted due to the reasons above.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 5 - Medium environmental impact <u>Support:</u> Leaking oil from a substation transformer could require remediation of the soil on site.
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> The new equipment will reduce the failure rates and improve the system reliability.
	System Renewal This project is for replacement of distribution assets where: 5 - ACA health index "Fair" <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? A failure of a power transformer or circuit breaker may result in a prolonged outage to our customers which would negatively impact system reliability. There may also be a high cost associated with environmental clean up if the power transformer suffers a catastrophic failure.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies Support: Comments...	This project will save or avoid operational costs of: 0 - No significant amount
	One-Time Costs Support: 2015 - \$0.45M 2016 - \$2.35M	This project will incur/create one-time costs of: \$2,800,000
	Ongoing Costs Support: Comments...	This project will incur/create ongoing costs of: -
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 47 years What type of assets are being replaced? Power Transformers & Switchgear Units

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

FEEDER	SUBSTATION_NAME	VOLTAGE	TS_FEEDER	TS_VOLTAGE	NUM_CUSTOMERS	NUM_TRANSFORMERS
4F1	RIFLE RANGE	4.16	46M14	27.6	87	5
4F2	RIFLE RANGE	4.16	46M14	27.6	70	12
4F3	RIFLE RANGE	4.16	46M14	27.6	615	49
4F4	RIFLE RANGE	4.16	46M13	27.6	445	45
4F5	RIFLE RANGE	4.16	46M13	27.6	553	38

PROJECT APPROVALS

 Business Unit Manager / Division Director

 Date

 Key Stakeholder (if appropriate)

 Date

 VP, Division

 Date

 VP, Asset Management Strategy

 Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$2,800,000 <i>Variance:</i> <u>(\$2,800,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on Customer Service Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No brand impact Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No safety risk Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 5 - Medium environmental impact Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 10 - Prevent 100,000 customer minutes of outage Support: Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 5 - Upgrade existing infrastructure to support existing service capacity Support: The new equipment will reduce the failure rates and improve the system reliability.
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: 5 - ACA health index "Fair" Support: Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Key Stakeholder (if appropriate)

VP, Division

VP, Asset Management Strategy

Date

Date

Date

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Cawthra MS
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0504 - SUBSTATION CONSTRUCTION
SPONSOR:	JP Michaud
INITIATOR:	Doru Voicu
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0504-4

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Based on the list of critical equipment in Enersource's Asset Condition Assessment (ACA), substation equipment was identified as the second most significant to the sustainability of the organization. Therefore, it is imperative that such equipment is replaced before a failure occurs which could have a negative impact on Enersource's customers as well as its reputation. The major power equipment installed at Cawthra MS consists of one low voltage switchgear line-up (LV), two 5 MVA power transformers, and two metal enclosed high voltage switchgears (HV). The switchgears line-ups and the power transformers were manufactured as follows: LV switchgear – 2014 Tx1 transformer – 1958 Tx2 transformer – 1987 HV1 switchgear – N/A (assumed 1958) HV2 switchgear – N/A (assumed 1987) The Tx1 power transformer and the HV1 breaker are well beyond the design life time of 40 years. The existing HV1 switchgear is equipped with fuse projection. The project consists of replacing the HV1 switchgear switchgear line-up and the power transformer TX1. The existing HV1 switchgear will be replaced with a new metal enclosed switchgear that has a circuit breaker complete with a relay in order to enhance the new the new transformer protection. The HV1 breaker with the relay will provide transformer differential protection as well as overcurrent protection. At present, a substandard method of protecting our critical power transformers with fuses is utilized.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The LV switchgear line-up at Cawthra MS houses magnetic air circuit breakers. The substation department plans to replace all switchgear units housing magnetic air circuit breakers by 2023 with modern vacuum circuit breakers.

The main reasons of replacing the switchgear are as follows:

- Increasing failure rates of magnetic air circuit breakers (2 failures in the past 12 months)
- Scarcity of spare parts (many spare parts are now obsolete)
- Elimination of arc chutes that may contain asbestos
- Replace the old magnetic circuit breaker technology with magnetic actuator technology
- Reduce the operating cost by increasing the time between maintenance interval from 3-4 years to 5 years and reducing the time required to maintain the circuit breakers
- Enhance the safety of our crews performing switching at the substation
- Eliminate / replace the existing switching units housed inside the substation

The Tx1 power transformer is 57 years old. The life of a transformer depends on the life of the insulation system - the solid insulation (cellulose papers) will degrade with age. The amount of degradation is a function of mainly the operating temperature, presence of air and / or water product decomposition and oxidation dissolved in the insulating oil. It is good utility practice to replace substation power transformers before they fail.

A power transformer failure at Cawthra MS may affect over 500 customers, which may subject the customers be exposed to a prolonged outage. Also there is a high environmental and financial risks due to the possible oil spills as well as the subsequent cleaning costs.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Replacing the existing switchgear units with new ABB arc resistant switchgear; replacing the existing transformer with new 5MVA transformer**

New equipment will significantly reduce failure rates and subsequent outage costs to Enersource and its customers.

OPTION 2: **Replacing the existing Tx1 transformer with a spare unit**

This will represent a short term solution since two 5 MVA spare transformers were are mostly manufactured in 1968 and, 1969 and would not provide the longevity required.

OPTION 3: **Do not replace / retrofit the power equipment.**

An equipment failure will have a negative impact on Enersource's customers and its reputation. The system reliability will be affected and restoration of the system to normal conditions will take 8-10 months since the switchgear and power transformer both have long lead delivery times.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Replace the existing switchgear with new ABB arc resistant switchgear; the option to retrofit the circuit breakers was not adopted due to the reasons listed above.

Replace the Tx1 transformer with a new 5 MVA transformer; the option to use spare transformers was not adopted due to the reasons above.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? (If response is "No", continue to Customer Focus section) No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 5 - Medium environmental impact
	<u>Support:</u> Leaking oil from a substation transformer could require remediation of the soil on site.	
	System Reliability	This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage
	<u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.	
	System Expansion	This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity
	<u>Support:</u> The new equipment will reduce the failure rates and improve the system reliability.	
	System Renewal	This project is for replacement of distribution assets where: 5 - ACA health index "Fair"
	<u>Support:</u> Comments...	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 2016
	Urgency of implementation? 1 year to 3 years
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? A failure of a power transfoemer or circuit breaker may result in a prolonged outagae to our customers which would negatively impact system reliability. There may also be a high cost associated with environmental clean up if the power transformer suffers a catastrophic failure.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies Support: Comments...	This project will save or avoid operational costs of: 0 - No significant amount
	One-Time Costs Support:	This project will incur/create one-time costs of: \$800,000
	Ongoing Costs Support: Comments...	This project will incur/create ongoing costs of: -
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? > 50 years What type of assets are being replaced? Power Transformer & Switchgear Units

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

FEEDER	SUBSTATION_NAME	VOLTAGE	TS_FEEDER	TS_VOLTAGE	NUM_CUSTOMERS	NUM_TRANSFORMERS
9F1	Cawthra	4.16	46M19	27.6	41	5
9F2	Cawthra	4.16	46M19	27.6	115	15
9F3	Cawthra	4.16	46M19	27.6	401	28

PROJECT APPROVALS

 Business Unit Manager / Division Director

 Date

 Key Stakeholder (if appropriate)

 Date

 VP, Division

 Date

 VP, Asset Management Strategy

 Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$800,000 <i>Variance:</i> <u>(\$800,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> <u>-</u> <i>Variance:</i> <u>-</u> <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on Customer Service Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No brand impact Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 0 - No safety risk Support: Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: Final Assessment: Select from drop-down menu Initial Assessment: 5 - Medium environmental impact Support: Comments...
	System Reliability This project maintains or improves system reliability: Final Assessment: Select from drop-down menu Initial Assessment: 10 - Prevent 100,000 customer minutes of outage Support: Comments...
	System Expansion This project increases system capacity: Final Assessment: Select from drop-down menu Initial Assessment: 5 - Upgrade existing infrastructure to support existing service capacity Support: Comments...
	System Renewal This project is for replacement of distribution assets where: Final Assessment: Select from drop-down menu Initial Assessment: 5 - ACA health index "Fair" Support: Comments...

LESSONS LEARNED
Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Webb MS
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0504 - SUBSTATION CONSTRUCTION
SPONSOR:	JP Michaud
INITIATOR:	Doru Voicu
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	July-30-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0504-5

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Currently, there are approximately 65 high rise buildings in the Downtown Core. There are three substations supplying the current load: Woods MS, Confederation MS, and City Centre MS. These substations are equipped with either two or three power transformers and most of their capacity is dedicated to supply the existing load to the Downtown Core. The total connected transformation in the Downtown Core is approximately 130 MVA. The current capacity available for all districts of the Downtown area is 140 MVA. The small overcapacity allows for short term growth and N-1 contingency in the Downtown Core. In addition, John MS, located on Hurontario Street near John Street, which supplies power to the Mississauga Valley and Sussex districts, also serves as a backup to the Downtown area. Based on the proposed model and Master Plan provided by the City, it is estimated that upon completion of Downtown 21, the combined transformation will increase to approximately 300MVA by 2050. Enersource will have to incrementally expand its infrastructure in the Downtown Core and increase the number of substations in order to reliably supply power to all the buildings. As a first step, Webb MS is a growth driven investment in order to provide additional capacity for the planned residential / commercial and transit infrastructure development in the area. The project scope for 2016 includes the following: • Completion of the municipal substation building; • Placing of an order for the following major substation equipment: - HV switchgear - LV switchgear - Power Transformer At completion, the substation will house one 20 MVA power transformer, one high voltage switchgear and one low voltage switchgear unit which will deliver power via eight 13.8 kV feeders. The substation will have provision to add an additional 20 MVA of future capacity if required.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Webb MS represent a growth driven investment to provide additional capacity for the planned residential / commercial and transit infrastructure development in the Mississauga downtown area.

The project implementation is required by the System Planning Department. As part of new load requirements, Enersource determines whether a Conservation program could offset the additional load. In the event that conservation efforts can not offset the expected load growth, new capacity is constructed. The CDM program is estimated to reduce 1 % or 1,887 MW of the area load. This is far short of the expected load growth; thus building additional capacity will still be required.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: ***Install additional transformer(s) and feeder(s) at the City Centre MS site***

There are three transformers installed at the City Centre MS site where the existing infrastructure, including duct banks and switchgears, is fully utilized. The installation of any additional transformers and feeders will require a major reconstruction of the substation and the associated civil infrastructure. In addition, new feeders coming out of the substation will have de-rated capacity due to main feeder cable congestion and restricted duct bank configuration. As a result, the installation of an additional transformer is not economical and does not meet the technical requirements needed to supply load in the Downtown Core efficiently.

OPTION 2: ***Install an additional transformer at the John MS site***

The John MS site has sufficient space for the installation of an additional transformer. However, the new feeders coming out of the substation cannot be extended north to the Downtown Core unless a new, second pole line is constructed along the west side of Hurontario Street from John MS to Burnhamthorpe Road. Considering future projects, including the LRT along Hurontario Street, it is unlikely that Enersource will be granted permission to install a new pole line on the west side of Hurontario Street, in addition to the existing pole line on the east side. As well, John MS is approximately 2 km away from the Downtown Core. Bringing feeders from John MS would mean supplying very concentrated load at the end of the feeders which would add complexity with issues such as fault levels and voltage drops.

OPTION 3: ***Install new substations to provide additional capacity to the downtown area***

Due to the existing infrastructure in the Downtown Core and predicted location of the new load, it is suggested to install new substations at two separate locations; one in the northern part and one in the southern part of the Downtown Core. After careful review and consideration of the existing feeder locations, future development and locations of the existing substations, the optimal locations for the the substations are near the intersection of Webb Drive and Kariya Drive (Webb MS) for the southern part and near the intersection of Duke of York Boulevard and Centre View Drive for the northern part of the Downtown Core (Duke MS). These locations are 600 meters from the high concentration of loads, avoiding the fault level and voltage issues mentioned in Option 2.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

The Webb MS substation will be designed and constructed for dual transformer setup, however, the substation will initially be equipped with only one high voltage transformer. The second transformer will be added at a later date, as the load from the new buildings in the southern part of the Downtown Core materializes. The substation will comprise of six 13.8 kV feeders to serve the downtown core.

PROJECT BENEFITS / RISKS MITIGATED

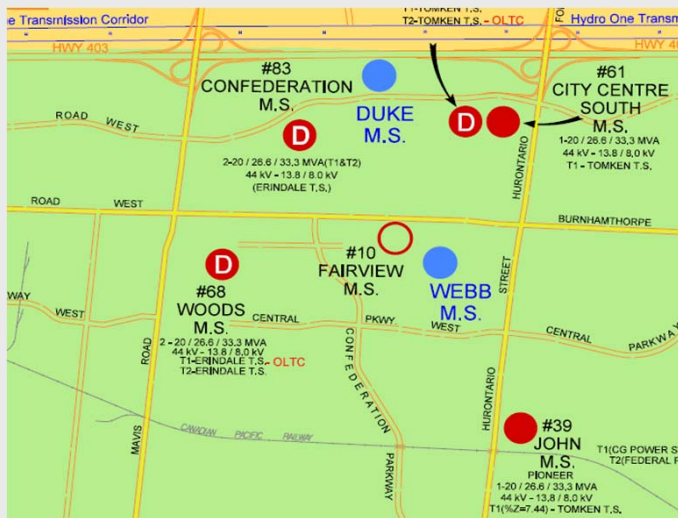
Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Downtown 21 will use more load than we can accommodate due to additional buildings, LRT, etc.
	System Renewal This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2017
	What is the impact of deferring or not meeting the specified deadline date? Low - part of long term planning. Land required may be limited the longer we wait. Cost of land will also appreciate in value.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Long term Downtown 21 infrastructure and LRT would be impacted due to capacity constraints.



PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): Please specify	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$7,375,000 <i>Initial Assessment:</i> \$7,375,000 <i>Variance:</i> (\$7,375,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> \$36,000 <i>Initial Assessment:</i> \$36,000 <i>Variance:</i> (\$36,000) <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu Final Assessment: Initial Assessment: Not Applicable Support: Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on Customer Service Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No brand impact Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...	This projects mitigates exposure that could cause:
	Environmental Impact/risk <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...	This projects mitigates exposure that could cause:
	System Reliability <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...	This project maintains or improves system reliability:
	System Expansion <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Comments...	This project increases system capacity:
	System Renewal <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...	This project is for replacement of distribution assets where:

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS	
_____	_____
Business Unit Manager / Division Director	Date
_____	_____
Key Stakeholder (if appropriate)	Date
_____	_____
VP, Division	Date
_____	_____
VP, Asset Management Strategy	Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Mini-Britannia Substation (44kV - 27.6 kV)
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0504 - SUBSTATION CONSTRUCTION
SPONSOR:	JP Michaud
INITIATOR:	Doru Voicu
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	July-30-15
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0504-6

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY

Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).

Based on the System Planning load forecast a new substation is required to be installed in the Britannia–Credit View area. It is a capacity driven investment. During the Regional Planning effort with Hydro One and participating LDC's, including Enersource, it was determined that Erindale TS T1/T2 is expected to be overloaded above 10-day LTR during summer peaks. The peak load at Erindale TS T1/T2 has reached capacity, and is expected to exceed it by as much as 40 MW by 2023. It was concluded that the capacity needs of Erindale TS T1/T2 should be addressed through available transformation capacity existing adjacent to the limiting assets.

The proposed Mini-Britannia MS is planned to be supplied from Churchill Meadows TS (44kV system) and provide additional capacity to feed the 27.6kV load currently supplied by Erindale TS T1/T2. This configuration will reduce over-capacity loading at Erindale TS T1/T2 while balancing the loading capability on 44kV system via Churchill Meadows TS.

The land purchase is estimated to be completed in 2016 - estimated cost \$0.5M. The new station will add 40 MVA of capacity by the end of 2019 and the project scope includes the following work:

- 2018
 - o Acquisition of one 20 MVA on-load power transformer;
 - o Acquisition of one high voltage 46 kV switchgear;
 - o Place on order for a pre-engineered electrical house (E-House) come complete with a low voltage 38kV metal clad switchgear line-up (to be operated at 27.6 kV)
- 2019
 - o Acquisition of one 20 MVA on-load power transformer;
 - o Acquisition of one high voltage 46 kV switchgear;
 - o Delivery of the electrical house (E-House) housing the 38kV arc resistant metal clad switchgear
 - o Installation and commissioning of the substation components

At completion, the substation will house two power transformers, two high voltage switchgears and two low voltage switchgears that will deliver power via four 27.6 kV feeders.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

During the Regional Planning effort with Hydro One and participating utilities, including Enersource, it was determined that Erindale TS T1/T2 is expected to be overloaded above 10-day LTR during summer peaks. The peak load at Erindale TS T1/T2 reached capacity, and is expected to exceed it by as much as 40 MW by 2023. It was concluded that the capacity needs to Erindale TS T1/T2 should be addressed through available transformation capacity existing adjacent to the limiting assets.

As part of new load requirements, Enersource determines whether a Conservation program could offset the additional load. In the event that conservation efforts can not offset the expected load growth, new capacity is constructed. The CDM program is estimated to reduce 1 % or 2.1 MW of the load in the area. This is far short of the LTR shortfall; thus additional capacity will be required.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *New Transformer Station (TS) – Transfer some existing 27.6 kV load from Erindale TS to the new TS*

Since the load is not expected to grow much beyond the 10 day LTR over the next 10 years, building a full size TS will be expensive and not feasible.

OPTION 2: *Load transfer – Transfer some existing 27.6 kV load from Erindale TS to Cooksville TS*

Cooksville TS is separated from Erindale T1/T2 by a 44 kV service area. It would be operationally challenging and expensive to build new 27.6 kV feeders through 44 kV service territory.

OPTION 3: *Build a new substation to utilize extra 44 kV station capacity at Erindale TS T3/T4 and/or Churchill Meadows TS*

- There is extra capacity available in the area 44 kV system that can be utilized by building a step down (44/27.6 kV) substation. This new substation will be supplied from two 44kV feeders. Enersource has experience with this type of substation since the first 44/27.6 kV substation was commissioned in 2002. Also Mini-Britannia MS will be similar with Mini-Orlando MS which is designed in 2015. The power transformers, the high voltage and low voltage switchgear units will be identical to the units ordered for Mini-Orlando MS.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Option 3 will involve planning and building a new substation by the LDC to utilize the extra 44 kV station capacity available at the neighbouring Churchill Meadows TS. This is the most viable option. Considering the cost (considerably lower cost than a transformer station), reliability and standardization of the major power equipment (transformers and switchgear), this is the most viable option that Enersource has chosen.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u>
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u>	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u>	
	System Reliability	This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage
	<u>Support:</u>	Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.
	System Expansion	This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk
	<u>Support:</u>	The new substation will reduce over-capacity loading at Erindale TS T1 &T2 while balancing the loading capability on 44 kV system via Churchill Meadows TS.
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

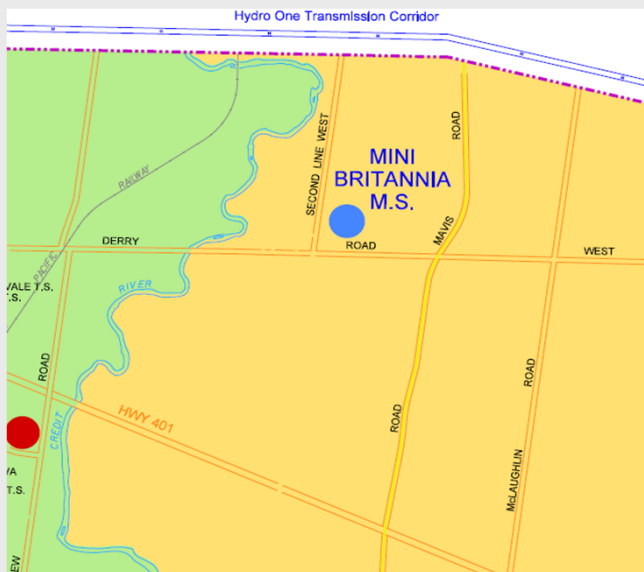
Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 2018
	Urgency of implementation? 3 to 5 years
	Note: Need to purchase land prior, currently aiming for 2016 And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Low - part of long term planning. Land required may be limited the longer we wait. Cost of land will also appreciate in value.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$7,525,000 C0504 Substations: 2016 - \$0.5M; 2018 - \$2.5M, 2019 - \$2.0M \$0.5M for Land will be acquired in 2016 and considered in service since it is in condition to perform as required.
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: \$36,000 This is a yearly operating cost consisting of maintenance, inspection, Grounds & Building upkeep and property taxes.
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): Please specify	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> \$7,525,000 <i>Initial Assessment:</i> \$7,525,000 <i>Variance:</i> (\$7,525,000) <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> \$36,000 <i>Initial Assessment:</i> \$36,000 <i>Variance:</i> (\$36,000) <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu Final Assessment: Initial Assessment: Not Applicable Support: Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on Customer Service Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No brand impact Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...	This projects mitigates exposure that could cause:
	Environmental Impact/risk <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...	This projects mitigates exposure that could cause:
	System Reliability <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...	This project maintains or improves system reliability:
	System Expansion <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Comments...	This project increases system capacity:
	System Renewal <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...	This project is for replacement of distribution assets where:

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS	
_____ Business Unit Manager / Division Director	_____ Date
_____ Key Stakeholder (if appropriate)	_____ Date
_____ VP, Division	_____ Date
_____ VP, Asset Management Strategy	_____ Date



PROJECT BUSINESS CASE

PROJECT NAME:	Duke MS
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0504 - SUBSTATION CONSTRUCTION
SPONSOR:	JP Michaud
INITIATOR:	Doru Voicu
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0504-7

OEB CATEGORY FOR CAPITAL EXPENDITURES

	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY

Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).

Currently, there are approximately 65 buildings in the Downtown Core. There are three substations: Woods MS, Confederation MS, and City Centre MS. These substations are equipped with either two or three power transformers and most of their capacity is dedicated to supply the existing load to the Downtown Core. In addition, John MS, located on Hurontario Street near John Street, also provides power to the Downtown 21 area, especially to Mississauga Valley and Sussex districts. The total connected transformation in the Downtown Core is approximately 130 MVA. The current capacity available for all districts of the Downtown 21 area is approximately 140MVA. The small overcapacity allows for short term growth and N-1 contingency in the Downtown Core. Based on the proposed model and Master Plan provided by the City, it is estimated that upon completion of Downtown 21, the combined transformation will increase to approximately 300MVA. Enersource will have to expand its infrastructure in the Downtown Core and increase the number of substations in order to reliably supply power to all the buildings.

Duke MS is a growth driven investment in order to provide additional capacity for the planned residential / commercial and transit infrastructure development in the area.

This project consists of adding 20 MVA of capacity by the end of 2021. The land purchase is estimated to be completed in 2016 - estimated cost \$0.5M. The project scope for 2020 includes the following:

- Completion of the municipal substation building;
- Placed on order the following major substation equipment:
 - HV switchgear
 - LV switchgear
 - Power Transformer

At completion, the substation will house one 20 MVA power transformer, one (1) high voltage switchgear and one low voltage switchgear unit which will deliver power via eight (8) 13.8 kV feeders. The substation will have provision to add an additional 20 MVA of future capacity if required.

If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.

Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?

Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The project implementation is required by the System Planning Department. As part of the solution to meet the load growth projection, Enersource plans to run a Conservation program in the downtown area to reduce the expected load growth. The CDM program projects a reduction of 1,887 kW off the projected incremental system demand in the downtown area. This is equivalent to an annual reduction of 1 % on incremental load and is consistent with CDM 2011- 2014 targets achieved (90% of 92 MW of summer peak demand). Also, the new 2015 -2020 conservation first framework energy reduction targets of 483 GWH should result in approximately 1% peak demand load reduction per annum over the 6 year period to 2020.

Duke MS represent a growth driven investment to provide additional capacity for the planned residential / commercial and transit infrastructure development in the Mississauga downtown area.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: **Install additional transformer(s) and feeder(s) at the City Centre MS site**

There are three transformers installed at the City Centre MS site where the existing infrastructure, including duct banks and switchgears, is fully utilized. The installation of any additional transformers and feeders will require a major reconstruction of the substation and the associated civil infrastructure. In addition, new feeders coming out of the substation will have de-rated capacity due to main feeder cable congestion and restricted duct bank configuration. As a result, the installation of an additional transformer is not economical and does not meet the technical requirements needed to supply load in the Downtown Core efficiently.

OPTION 2: **Install an additional transformer at the John MS site**

The John MS site has sufficient space for the installation of an additional transformer. However, the new feeders coming out of the substation cannot be extended north to the Downtown Core unless a new, second pole line is constructed along the west side of Hurontario Street from John MS to Burnhamthorpe Road. Considering future projects, including the LRT along Hurontario Street, it is unlikely that Enersource will be granted permission to install a new pole line on the west side of Hurontario Street, in addition to the existing pole line on the east side.

OPTION 3: **Install new substations to provide additional capacity to the downtown area**

With the expansion above, additional three to four transformers will still need to be installed in the downtown area. Due to the existing infrastructure in the Downtown Core and predicted location of the new load, it is suggested to install the new transformers at two separate locations; one in the northern part and one in the southern part of the Downtown Core. After careful review and consideration of the existing feeder locations, future development and locations of the existing substations, the optimal location for the northern substation is near the intersection of Center View Drive and Duke of York Boulevard (Duke MS).

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

The Duke MS substation will be designed and constructed for dual transformer setup, however, the substation will initially be equipped with only one high voltage transformer. The second transformer will be added at a later date, as the load from the new buildings in the southern part of the Downtown Core materializes. The substation will comprise of 6 to 8 - 13.8 kV feeders to serve the downtown core.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee)	This projects mitigates exposure that could cause: 0 - No safety risk
	<u>Support:</u> Comments...	
	Environmental Impact/risk	This projects mitigates exposure that could cause: 0 - None
	<u>Support:</u> Comments...	
	System Reliability	This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage
	<u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area. Will also reduce customer count per feeder, thus having fewer customers affected by each outage.	
	System Expansion	This project increases system capacity: 10 - New infrastructure to avert major system constraint/risk
	<u>Support:</u> Downtown 21 will use more load than we can accommodate due to additional buildings, LRT, etc.	
	System Renewal	This project is for replacement of distribution assets where: 0 - ACA health index "Very Good" or N/A
	<u>Support:</u>	

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 2016
	Urgency of implementation? 1 year to 3 years
	And/or enter specific deadline/implementation date: 2016
	What is the impact of deferring or not meeting the specified deadline date? Low - part of long term planning. Land required may be limited the longer we wait. Cost of land will also appreciate in value.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? Long term Downtown 21 infrastructure and LRT would be impacted due to capacity constraints.

FINANCIAL SUMMARY

Financial Performance	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount	
	<u>Support:</u>		
	One-Time Costs	This project will incur/create one-time costs of: \$5,100,000	
	<u>Support:</u> C0504 Substations: 2016 - \$0.5M; 2020- \$2.5M; 2021 - 2.1M \$0.5M for Land will be acquired in 2016 and considered in service since it is in condition to perform as required.		
Financial viability is maintained; and savings from operational effectiveness are sustainable.	Ongoing Costs	This project will incur/create ongoing costs of: -	
	<u>Support:</u> Comments...		
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? Select from drop-down menu What type of assets are being replaced? Please specify	Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): Please specify	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$5,100,000 <i>Variance:</i> <u>(\$5,100,000)</u> <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No impact on Customer Service <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No brand impact <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - None <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - New infrastructure to avert major system constraint/risk <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - ACA health index "Very Good" or N/A <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Substation Site Enhancements
PROGRAM NAME:	Subtransmission/Distribution
BUSINESS UNIT:	C0504 - SUBSTATION CONSTRUCTION
SPONSOR:	JP Michaud
INITIATOR:	Doru Voicu
DEPARTMENTS INVOLVED:	Asset Operations, Asset Management, Purchasing
DATE SUBMITTED:	
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0504-8

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Among the list of critical equipment in Enersource's Asset Condition Assessment, substation equipment was identified as the second most significant to the sustainability of the organization. Therefore, it is imperative that such equipment is replaced before a failure occurs which could have negative impact on Enersource's customer as well as its reputation. At present there are 66 municipal substations in service at Enersource. There are two types: • 52 bungalow building type substations; and • 14 outdoor substations. The substation sites enhancement plan consists of small projects at different sites in order to preserve and to improve the substation site condition. They include roof replacements, paving, small civil construction projects, and adding gravel in the transformer yards.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i>	
☐	Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500?
☐	Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

Since there are 52 bungalow type buildings housing critical substations assets, the Substations Department is planning to undertake 2-3 roof replacements projects each year.

On a monthly basis, substation inspections are completed to identify the sites that require upgrades/repairs such as:

- Paving the substation driveway;
- Re-gravelling the transformer yard to maintain the step and touch potentials at acceptable levels;
- Painting the switchgear room;
- Cleaning graffiti from substation walls;
- Repairing the cracks in the wall due to brick deterioration in order to avoid moisture and leaks;
- Repairing / replacing the access doors when required in order to enhance the security;
- Repairing / replacing substation fences as required for security reasons

The main reason for undertaking these projects is to protect the power equipment housed inside the substations and to prevent failures due to moisture or water leaking into the switchgear.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: ***Perform the required repairs / replacements as planned based on the site conditions***

Ensure appropriate protection of equipment and mitigate situations that can lead to or accelerate degradation of equipment.

OPTION 2: ***Defer some activities (providing that security of the electrical equipment is not compromised) due to the emergency repairs or unforeseen conditions***

Will reduce operating costs in current year but long term costs associated with substation issues would be higher.

OPTION 3: ***Do not perform any activities regarding substation sites.***

There will be a high risk of damaging the electrical equipment inside the substations due to moisture, leaks. A major power equipment failure may result in a prolonged outage affecting the system reliability. There may be also safety hazards due to step and touch potentials if we don't maintain the gravel in the transformer yard.

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Undertake substations site enhancement projects to maintain the proper substations operations and to enhance security of the substation sites.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 0 - No impact on any ESQR <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? 0 - No impact on Customer Service <u>Support:</u>
	Reputational Risk Does this project reduce or eliminate a reputational risk? 0 - No brand impact <u>Support:</u>

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 5 - Medical aid injury <u>Support:</u>
	Environmental Impact/risk This projects mitigates exposure that could cause: 5 - Medium environmental impact <u>Support:</u> Leaking oil from a substation transformer could require remediation of the soil on site.
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Improves switching capability to restore power in the event of an outage thereby shortening outage duration in the area.
	System Expansion This project increases system capacity: 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> The new equipment will reduce the failure rates and improve the system reliability.
	System Renewal This project is for replacement of distribution assets where: 5 - ACA health index "Fair" <u>Support:</u>

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q2 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 1 year to 3 years 2016
	What is the impact of deferring or not meeting the specified deadline date? A failure of a power transformer or circuit breaker may result in a prolonged outage to our customers which would negatively impact system reliability. There may also be a high cost associated with environmental clean up if the power transformer suffers a catastrophic failure.
	What level of uncertainty is associated to implementation (unknowns or variables)? Low
	Do other projects rely on this project being completed? No

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies <u>Support:</u>	This project will save or avoid operational costs of: 0 - No significant amount
	One-Time Costs <u>Support:</u>	This project will incur/create one-time costs of: \$300,000
	Ongoing Costs <u>Support:</u>	This project will incur/create ongoing costs of: -
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? > 50 years What type of assets are being replaced? Power Transformer & Switchgear Units Anticipated Derecognition

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT APPROVALS	
Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project									
Work Order(s):	<i>Please specify</i>								
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	<table style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #ffcc00;"> <td style="width: 40%; padding: 5px;"> Cost Efficiencies <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments... </td> <td style="width: 60%; padding: 5px;"> This project will save or avoid operational costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$300,000 <i>Variance:</i> <u>(\$300,000)</u> <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> This project will incur/create one-time costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> This project will incur/create ongoing costs of: </td> </tr> <tr style="background-color: #ffcc00;"> <td style="padding: 5px;"> Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments... </td> <td style="padding: 5px;"> How much derecognition expense resulted from this project? </td> </tr> </table>	Cost Efficiencies <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...	This project will save or avoid operational costs of:	One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$300,000 <i>Variance:</i> <u>(\$300,000)</u> <u>Support/Explanation:</u> Comments...	This project will incur/create one-time costs of:	Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	This project will incur/create ongoing costs of:	Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	How much derecognition expense resulted from this project?
Cost Efficiencies <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...	This project will save or avoid operational costs of:								
One-Time Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> \$300,000 <i>Variance:</i> <u>(\$300,000)</u> <u>Support/Explanation:</u> Comments...	This project will incur/create one-time costs of:								
Ongoing Costs <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	This project will incur/create ongoing costs of:								
Impact on Distribution Rates / Revenue Requirement <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...	How much derecognition expense resulted from this project? 								

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: Select from drop-down menu Final Assessment: Initial Assessment: Not Applicable Support: Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on any ESQR Support: Comments...
	Customer Satisfaction Does this project add Customer Value? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No impact on Customer Service Support: Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? Final Assessment: Select from drop-down menu Initial Assessment: 0 - No brand impact Support: Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medical aid injury <u>Support:</u> Comments...	This projects mitigates exposure that could cause:
	Environmental Impact/risk <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Medium environmental impact <u>Support:</u> Comments...	This projects mitigates exposure that could cause:
	System Reliability <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...	This project maintains or improves system reliability:
	System Expansion <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Upgrade existing infrastructure to support existing service capacity <u>Support:</u> Comments...	This project increases system capacity:
	System Renewal <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - ACA health index "Fair" <u>Support:</u> Comments...	This project is for replacement of distribution assets where:

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director

Date

Key Stakeholder (if appropriate)

Date

VP, Division

Date

VP, Asset Management Strategy

Date



PROJECT BUSINESS CASE	
PROJECT NAME:	Subtransmission Expansion
PROGRAM NAME:	2016-2021 Subtransmission Expansion
BUSINESS UNIT:	C0507 - SUBTRANSMISSION/ DISTRIBUTION
SPONSOR:	MATT HOTTHAM
INITIATOR:	ANDREW HOUSTON
DEPARTMENTS INVOLVED:	ASSET OPERATIONS, ASSET MANAGEMENT, PURCHASING
DATE SUBMITTED:	FRIDAY, JULY 28, 2015
DATE APPROVED:	
DATE STARTED:	
DATE COMPLETED:	
BUSINESS CASE #:	2016-C0507-1 - SUBTRANSMISSION EXPANSION

OEB CATEGORY FOR CAPITAL EXPENDITURES	
	System Access
	System Renewal
X	System Service
	General Plant

PROJECT DESCRIPTION/SUMMARY	
<i>Provide a brief depiction of the project summarizing each component of the business case (including issue, solution, benefits, financials, etc.).</i> Subtransmission expansion covers capital projects that will allow Enersource to build additional circuits required to meet future load demands. These projects ensure that Enersource meets its regulatory obligation under the Distribution System Code of ensuring adequate supply and connection of new and existing customer loads in the City of Mississauga.	
<i>If the business case request is related to Information Technologies, indicate the amount of effort and cost associated with the project by placing an X next to the appropriate option below.</i> ☐ Information Technology Request: Does the project require >80 hours of effort and cost more than \$7500? ☐ Information Technology Request: Does the project require <80 hours of effort and cost less than \$7500?	

ISSUE TO SOLUTION

BACKGROUND/PROBLEM/OPPORTUNITY

In this section, provide some background information focusing on the identification of the problem or opportunity.

The subtransmission expansion business unit includes the following projects for 2016:

In 2006, HONI and Enersource, along with the other utilities within the study area, completed the GTA West Supply Study. This study identified a need for Churchill Meadows TS in western area of Mississauga. This station was required to meet future demand growth expected in western Mississauga and allow neighbouring transformer station to be offloaded. In 2010, Churchill Meadows was placed in service. In 2011, an underground egress and pole line with four 44 kV feeders was built westward from the TS to Ninth Line and Eglinton Ave. Churchill Meadows feeder egress project covers the installation of the feeder egress eastward from the new TS. The new pole line will have four 44 kV circuits and connect to the existing subtransmission feeders at Winston Churchill Blvd just north of Hwy 403.

Port Credit project covers installation of a new 27.6kV pole line comprised of ten poles to accommodate the connection of a new customer. The service area is currently supplied by the older 4.16kV system and due to the capacity limitations of 4.16kV circuits, the distribution feeders have to be upgraded to 27.6kV system.

Cawthra expansion project addresses the replacement of an aged underground subtransmission circuits that have reached the end of its life. This project proposes to abandon the existing underground cables along Cawthra Rd and replace existing connections with an overhead pole line from Burnhamthorpe to Bloor Street.

Webb MS is a growth driven investment in order to provide additional capacity for the planned residential / commercial and transit infrastructure development in the downtown core. The scope of the feeder egress project will be to bring in two 44kV sub-transmission feeders and eight 13.8kV distribution feeders at the proposed location of the station. Refer to business case 2016-C0504-5 Webb MS for more information on Webb MS project.

OPTIONS CONSIDERED

Based on the summation above, outline decision criteria and options considered (including remaining status quo). Include pros and cons of each option, financial impact, and risks/benefits.

OPTION 1: *Status Quo*

This option would result in insufficient capacity to connect customer load and thus, direct violation of the Distribution System Code of ensuring timely connection of new customers

OPTION 2: *Carry out necessary system upgrades to ensure adequate capacity available to meet future demand*

This option ensures there is adequate capacity to meet new customer connections and ensure continued delivery of power in a reliable and safe manner.

OPTION 3:

SOLUTION

Identify and describe the chosen solution, providing rationale for the choice. In addition, provide reasoning for not proceeding with the alternatives.

Carrying out necessary system upgrades was chosen as the most prudent option to ensure adequate capacity is available to meet future demand in the downtown core and south part of the City. This option ensures that Enersource continues its regulatory obligation of connecting and supplying power to new and existing customers.

PROJECT BENEFITS / RISKS MITIGATED

Business Values	Performance Categories
Regulatory / Public Policy Responsiveness	Is this a mandatory project? <i>(If response is "No", continue to Customer Focus section)</i> No
	If project is mandatory, please select one of the following: Not Applicable
	If project is mandatory, can this project be deferred? Not Applicable
	<u>Support:</u>

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? 5 - Improvement of multiple ESQRs <u>Support:</u> The proposed projects will allow Enersource to provide reliable and safe power and ensuring that anticipated customer growth is met
	Customer Satisfaction Does this project add Customer Value? 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Capacity related capital expenditure, not related to customer surveys/feedback.
	Reputational Risk Does this project reduce or eliminate a reputational risk? 5 - Helps preserve brand <u>Support:</u> Renewing aging equipment and increasing capacity to meet the needs of future customer growth should help preserve the brand.

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: 3 - Low environmental impact <u>Support:</u> Minimal environmental impact due to replacement of aging equipment.
	System Reliability This project maintains or improves system reliability: 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> These projects will improve system reliability by preventing equipment failures due to aging underground cables and distribution equipment. Main feeder on Cawthra from Burnhamthorpe to Bloor feeds ~1, 500 customers. Thus, one to two cable faults with restoration time of 30min would result in more than 100,000 customer outage minutes.
	System Expansion This project increases system capacity: 8 - New infrastructure required to support service capacity <u>Support:</u> Downtown 21 will use more load than we can accommodate due to additional buildings, LRT, etc.
	System Renewal This project is for replacement of distribution assets where: 10 - ACA health index "Very Poor" <u>Support:</u> Replacement of aging equipment with ACA health index of very poor/poor that are reaching end of its life cycle.

PROJECT TIMING & EXECUTION RISKS

Project Timing & Execution Risks	Do the stakeholders have resources committed to implementation? Yes
	Anticipated start date: Q1 2016
	Urgency of implementation? And/or enter specific deadline/implementation date: 6 month to 1 year Q4 2016
	What is the impact of deferring or not meeting the specified deadline date? Failure to provide additional supply capacity to meet future load demands. Risk of worsening reliability service due to aging underground infrastructure.
	What level of uncertainty is associated to implementation (unknowns or variables)? Medium
	Do other projects rely on this project being completed? Completion of Webb MS feeder egress will ensure timely construction and in-service of Webb MS substation. Refer to business case 2016-C0504-1 (Webb MS)

FINANCIAL SUMMARY

Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies	This project will save or avoid operational costs of: 0 - No significant amount	
	<u>Support:</u>		
	One-Time Costs	This project will incur/create one-time costs of: \$2.4M	
	<u>Support:</u> 2016 - Churchill Meadows Feeder Egress (Easement) - TS to Winston Churchill - \$450k 2016 - Port - Stavebank to Elizabeth - \$300k 2016 - Cawthra - Burnhamthorpe to Bloor - \$900k 2016 - Webb MS Feeder Egress - Section 1 - \$750k		
	Ongoing Costs	This project will incur/create ongoing costs of: 	
	<u>Support:</u>		
	Impact on Distribution Rates / Revenue Requirement	What is the age of the assets being replaced? 35 years	Anticipated Derecognition What type of assets are being replaced? main feeders, overhead transformers, vault
			-

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)

PROJECT APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date

PROJECT REVIEW - Complete at end of project	
Work Order(s): <i>Please specify</i>	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Cost Efficiencies This project will save or avoid operational costs of: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> 0 - No significant amount <u>Support/Explanation:</u> Comments...
	One-Time Costs This project will incur/create one-time costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> \$2.4M <i>Variance:</i> #VALUE! <u>Support/Explanation:</u> Comments...
	Ongoing Costs This project will incur/create ongoing costs of: <i>Final Assessment:</i> <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	Impact on Distribution Rates / Revenue Requirement How much derecognition expense resulted from this project? <i>Initial Assessment:</i> - <i>Variance:</i> - <u>Support/Explanation:</u> Comments...
	(Empty section for additional comments or data)

ASSESSMENT OF BENEFITS ACHIEVED / RISKS MITIGATED	
Upon project completion, assess the actual benefits achieved or risks mitigated and compare to the initial planned assessment.	
Business Values	Performance Categories
	If project is mandatory, please select one of the following: <i>Final Assessment:</i> <i>Select from drop-down menu</i> <i>Initial Assessment:</i> Not Applicable <u>Support:</u> Comments...

Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality Does the project improve a Customer Service ESQR metric? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Improvement of multiple ESQRs <u>Support:</u> Comments...
	Customer Satisfaction Does this project add Customer Value? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Positive improvement to customer experience (non-quantifiable) <u>Support:</u> Comments...
	Reputational Risk Does this project reduce or eliminate a reputational risk? <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 5 - Helps preserve brand <u>Support:</u> Comments...

Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety (Customer & Employee) This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 0 - No safety risk <u>Support:</u> Comments...
	Environmental Impact/risk This projects mitigates exposure that could cause: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 3 - Low environmental impact <u>Support:</u> Comments...
	System Reliability This project maintains or improves system reliability: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - Prevent 100,000 customer minutes of outage <u>Support:</u> Comments...
	System Expansion This project increases system capacity: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 8 - New infrastructure required to support service capacity <u>Support:</u> Comments...
	System Renewal This project is for replacement of distribution assets where: <i>Final Assessment:</i> Select from drop-down menu <i>Initial Assessment:</i> 10 - ACA health index "Very Poor" <u>Support:</u> Comments...

LESSONS LEARNED

Identify lessons learned from this project, including what went well and what could be improved for future projects.

PROJECT COMPLETION APPROVALS

Business Unit Manager / Division Director	Date
Key Stakeholder (if appropriate)	Date
VP, Division	Date
VP, Asset Management Strategy	Date



PROJECT SHEET

PROJECT NAME:	Churchill Meadows Feeder Egress (Easement) - TS to Winston Churchill
PROGRAM NAME:	2016 System Expansion
BUSINESS UNIT:	C0507 - System Expansion
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0507-1

PROJECT DESCRIPTION/SUMMARY

Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).

This project involves the purchase of an Easement to allow for the construction of four 44kV circuits with approximately 40 pole line out of Churchill Meadows TS. This transformer station was built to offload constrained capacity from Hydro One's Erindale and Bramalea transformer stations. In addition, this station provided capacity to meet future demand growth expected in western Mississauga.

Through this expansion, additional capacity at the station will be utilized while offloading nearby Erindale TS that is currently overloaded or near capacity. This load balancing will provide the immediate area with more connectivity and enable it to accommodate future commercial/ industrial upgrade requirements.

This also includes buying the property required to build the egress from the Infrastructure Ontario in the Hydro Right of Way (ROW)

This project compliments the first phase of the 2011 project - 44 kV Churchill Meadows TS egress.

In 2011, an underground egress and pole line with four 44 kV feeders was built westward from the TS to Ninth Line and Eglinton Ave.

This project covers the installation of the feeder egress eastward from the new TS. The new pole line will have four 44 kV circuits and connect to the existing subtransmission feeders at Winston Churchill Blvd just north of Hwy 403.

The completion of the project is subject to the acquisition of property rights from Infrastructure Ontario. The completion date is scheduled for end of 2016.

Project Cost: \$450,000

PROJECT BENEFITS / RISKS MITIGATED

Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.

Hydro One Networks Inc. (HONI), with co-operation from Enersource and several nearby utilities, completed a report in 2006 called the "GTA West Supply Study". This study looked at loading issues and future requirements in the area and as a result there was a need indicated for additional 44 kV capacity in the west side of the City. After careful analysis of alternatives with HONI it was recommended to construct the new 44 kV TS in the Ninth Line and Hwy 403 area to provide load relief, contingency, reliability and to meet the existing and future demand in the surrounding area.

Once Churchill Meadows TS is energized with all 8 feeders it will provide transformer and feeder loading relief for both Erindale TS and Meadowvale TS. During summer months, these TS's have periodically run past their Limited Thermal Ratings (10 day LTR).

APPENDIX

Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)



PROJECT SHEET	
PROJECT NAME:	Port - Stavebank to Elizabeth
PROGRAM NAME:	2016 System Expansion
BUSINESS UNIT:	C0507 - System Expansion
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0507-2

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> This project involves the building of a new 27.6Kv pole line comprised of ten poles to accommodate the connection of a new customer. This area is currently supplied by the older 4.16kV system. Due to system capacity limitations of 4.16kV circuits, the distribution feeders have to be upgraded to 27.6kV system. This upgrade will not only service this new customer but will provide additional capacity to support the continued growth in the area. Project Cost: \$300,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Implementation of this projects is in line with Enersource's asset management strategy of not only replacing distribution assets that are beyond end of life for specified areas but also proactively eliminating the need to invest in vintage 4.16kV assets and equipment by better utilizing the available capacity at higher standard voltages of 27.6kV systems.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	Cawthra - Burnhamthorpe to Bloor
PROGRAM NAME:	2016 System Expansion
BUSINESS UNIT:	C0507 - System Expansion
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0507-3

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> Currently there is no existing overhead infrastructure in this area. The existing load is supplied by an aged underground supply that has reached the end of its life. Due to financial constraints, it is more economically viable to abandon the existing underground cables along Cawthra Rd and replace existing connections with an overhead pole line from Burnhamthorpe to Bloor Street. A new overhead line will also allow for greater flexibility in expanding the system to accommodate new connections and service upgrades. Project Cost: \$900,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> This project will have new overhead circuits on Cawthra Rd, from Burnhamthorpe to Bloor St, allowing Enersource to abandon underground cables that are reaching the end of their useful life and have been experiencing a number of cable faults, resulting in poor reliability performance.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>



PROJECT SHEET	
PROJECT NAME:	WEBB MS FEEDER EGRESS - SECTION 1
PROGRAM NAME:	2016 System Expansion
BUSINESS UNIT:	C0507 - System Expansion
SPONSOR:	MATT HOTHAM
INITIATOR:	ANDREW HOUSTON
BUSINESS CASE #:	2016-C0507-4

PROJECT DESCRIPTION/SUMMARY
<i>Provide a brief depiction of the project including the problem/issue, options considered, solution, work required (e.g. number of poles, transformers to replace), location, and cost (capital and operating if applicable).</i> Webb MS is a growth driven investment in order to provide additional capacity for the planned residential / commercial and transit infrastructure development in the downtown core. Refer to business case 2016-C0504-1 (Webb MS). At completion, the substation will house one 20 MVA power transformer, one high voltage switchgear and one low voltage switchgear unit which will deliver power via eight 13.8 kV feeders. The scope of the feeder egress project will be to bring in two 44kV sub-transmission feeders and eight 13.8kV distribution feeders at the proposed location of the station. Project Cost: \$750,000

PROJECT BENEFITS / RISKS MITIGATED
<i>Explain benefits gained or risks mitigated by completing the project. See comment box at top right of header for areas to address.</i> Based on the proposed model and Master Plan provided by the City, it is estimated that upon completion of Downtown 21, the combined transformation will increase to approximately 300MVA by 2050. Enersource will have to incrementally expand its infrastructure in the Downtown Core and increase the number of substations in order to reliably supply power to all the buildings, which includes installation and commissioning of Webb MS. This project will ensure that two 44kV and eight 13.8kV distribution feeders are installed prior to construction of the substation, due to longer lead times of building a pole line in the busy downtown core.

APPENDIX
<i>Use this section to append any further supporting analysis and documentation. (e.g. maps, pictures, IOM data etc.)</i>