PROJECTS $500K AND OVER FOR 2013

SUSTAINING PORTFOLIO – UNDERGROUND SYSTEM

Table 1: Underground Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
20066	Dalmatian/Choiceland 47M13 UG Rebuild-Civil	10.0
18749	Replace/upgrade feeder A42W from PILC to 500kcmil TRXLPE cable	4.2
13311	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A52CS, A53CS and A54CS	3.3
22049	UG Rehab of NY51M29 off Don Mills and Graydon Hall Drive	2.9
18506	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A7B, A91B, and A93B	2.5
14133	85M7 UG rebuild on Festival & Carnival	2.1
13278	Northview Heights Civil Rebuild	2.1
18932	Replace/upgrade feeder A67E from PILC to 500kcmil TRXLPE cable	2.0
18803	Replace/upgrade feeder A51WR from PILC to 500kcmil TRXLPE cable	2.0
13239	Northview Heights Electrical Rebuild	2.0
13326	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A77E, A78E, and A79E	2.0
13316	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A41GD, A47GD and A48GD	2.0
18690	Replace/upgrade feeder A63E from PILC to 500kcmil TRXLPE cable	1.9
19798	Cable Chamber Location #6294 Piece out and PILC cable replacement	1.8
13287	55M31 Underground Lateral Replacement Ph#2	1.7
20633	Cable Chamber Rebuilds for PILC Replacement/Upgrade of	1.7

Estimate Number	Project Title	Estimated Cost ($ Millions)
	A63E	
20563	VC of Flemingdon MS feeders SS53-F3, F4, F5, F6 and F8 Electrical	1.7
19000	Replace/upgrade feeder A74DX from PILC to 500kcmil TRXLPE cable	1.7
20627	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A74DX	1.6
19011	Replace/upgrade feeder A43W from PILC to 500kcmil TRXLPE cable	1.5
21439	Rebuild Cable Chambers and Duct Structures along Millwood and Laird	1.5
22616	Ironside Crescent UG Rehab SCNAR26M21	1.5
18684	Replace/upgrade feeder A53B from PILC to 500kcmil TRXLPE cable	1.5
20437	Rehab of Transformers on SCNA502M24	1.5
21868	Rebuild UG Trunk NT63M12 M8 Brimley -Civil	1.4
20631	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A67E	1.4
20733	Rebuild of NY51M4 Consumers Rd & Victoria Park Areas - Electrical NY51M4	1.3
13284	55M31 Underground Lateral Replacement Ph#1	1.3
22718	UG Rebuild R26M34 Melford Customer Vaults	1.3
19019	Replace/upgrade feeder A44W from PILC to 500kcmil TRXLPE cable	1.3
20209	Rebuild Tallpine Subd and Durnford TH 47M17- Civil	1.3
13162	Starview / Rockbank UG Rehab	1.3
13193	Arrow Rd - Lateral UG Loop Replacement	1.3
22492	51M22, 51M4 UG rehab off Sheppard & Victoria Park Intersection-Electrical	1.2
21434	NY51M24 UG Rebuild in Subdivision by Don Mills & Sheppard Part 2 - Civil NY51M24	1.2
13306	Replace/Upgrade cable from PILC to 500 TRXLPE on A-91-	1.2

Estimate Number	Project Title	Estimated Cost ($ Millions)
	B	
20059	Venture Drive UG Rebuild Electrical SCNT47M1	1.1
18648	Windsor TS Load Transfer to Bremner TS	1.1
20925	Middlefield Passmore StateCrown Electrical SCNAR26M21	1.1
18503	Replace/upgrade feeder A20DX from PILC to 500kcmil TRXLPE cable	1.1
20335	Nashdene Tiffield SCNAR26M22 UG Rebuild - Civil	1.1
21933	Rebuild UG Trunk 502M21-28 Warden -Civil	1.1
12464	UG Cable Rehab on Antibes / Torresdale	1.1
12258	Lynmont /Milkwood - UG Rehab & VC	1.1
21433	NY51M24 UG Rebuild in Subdivision by Don Mills & Sheppard Part 1 - Civil NY51M24	1.0
18320	Clappison 47M17 UG Rebuild- Civil	1.0
20394	McNicoll Maybrook SCNAR26M32 UG Rebuild - Electrical	0.9
20136	Rehab of Feeder NAE5-2M3 in McCowan and Kingston area (Civil)	0.9
20207	Royal Rouge Trail UG Rebuild 47M17-Civil	0.9
21715	Strachan Civil Egress Phase 1	0.9
21664	Nugget Avenue UG Rebuild Electrical SCNAH9M23	0.9
20564	VC of Flemingdon MS feeders SS53-F3, F4, F5, F6 and F8 Civil	0.9
22212	UG Rebuild PJF2 Pastoria & Robert McIntosh SD- Civil	0.8
21589	Rebuild Orange File SD 502M22 UG-Civil	0.8
21334	51M30 UG Rehab off Leslie Street North of Bond Avenue	0.8
12490	UG DB Cable Rehab - Bombardier Supply	0.8
20990	Ironside Crescent UG Rebuild Electrical SCNAR26M21	0.8
23154	PPEast 2013 Feeder Automation Project on SCNT63M3	0.8
20312	NYSS53F7 Wynford Dr. UG Rebuild Civil Works	0.8
21869	Rebuild UG Trunk NT63M12 M8 Brimley - Electrical	0.8
20529	Scunthorpe - Invergordon H9M26 UG Rebuild 1 Phase - Electrical	0.8
13307	Replace/Upgrade cable from PILC to 500 TRXLPE on A-93-	0.8

Estimate Number	Project Title	Estimated Cost ($ Millions)
	B	
21663	Nugget Avenue UG Rebuild Civil SCNAH9M23	0.7
18743	Replace/upgrade feeder A13K from PILC to 500kcmil TRXLPE cable	0.7
20200	Durnford/Rylander/Tideswell 47M17 3-Ph Loop-Civil	0.7
22822	UG Rebuild Macey Denton R43M27-M23 Tie- Civil	0.7
21585	Rebuild Trunk 502M1 M22 Birchmount-Civil	0.7
21934	Rebuild UG Trunk 502M21-28 Warden -Electrical	0.7
21401	NY51M24 UG Rebuild in Subdivision by Don Mills & Sheppard Part 1 - Electrical NY51M24	0.7
23156	Feeder Automation Project on SCNA502M28	0.7
22220	UG Rebuild PJF3 Wondown & Milah Securities SD -Civil	0.7
13285	UG Lateral Cable Replacement	0.7
13273	UG Lateral Cable & Transformer Rehab Finch TS	0.7
13134	Constellation Crt - UG Rebuild & Voltage Conversion	0.7
20336	Nashdene Tiffield SCNAR26M22 UG Rebuild - Electrical	0.7
18639	Finchdene Industrial SCNAR26M31 UG Rebuild Phase 2 (Electrical)	0.6
22570	UG Rebuild 63M6 Mid Finch Silver Star Bv- Electrical	0.6
22460	UG Rebuild 502M26 Bonis Ave- Civil	0.6
19554	Terauley Piece Outs and Leakers	0.6
12451	UG Lat Cable and Tx Rehab Cedarcroft, Patricia, etc.	0.6
21188	Rebuild of SCNAE5-1M25 by Brimley Rd and Skagway Avenue Civil	0.6
20713	Strachan TS Feeder Transfer from A7-8T to new A11-12T Switchgear	0.6
22475	UG Rebuild 502M26 Bonis Ave- Electrical	0.6
22508	51M22, 51M4 UG rehab off Sheppard & Victoria Park Intersection-Civil	0.6
12449	UG Lateral Cable & Tx Rehab Bathurst & Rockford	0.6
21864	Rebuild UG Trunk NT63M8 M11 McCowan-Civil	0.5
18688	Replace/upgrade feeder A59H from PILC to 500kcmil	0.5

Estimate Number	Project Title	Estimated Cost ($ Millions)
	TRXLPE cable	
21410	NY51M24 UG Rebuild in Subdivision by Don Mills & Sheppard Part 2 - Electrical NY51M24	0.5
13114	Trunk Cable Replacement - The East Mall	0.5
20471	Scunthorpe - Invergordon H9M26 UG Rebuild 3 Phase - Electrical	0.5
22569	UG Rebuild 63M6 Mid Finch Silver Star Bv- Civil	0.5
	Total Cost	**114.5**

Portfolio:	Underground
Project Title:	Dalmatian/Choiceland 47M13 UG Rebuild-Civil
Project Number:	20066
Project Year:	2013
Estimate Cost:	$ 9,989,77

PROJECT DESCRIPTION

Objective:

The purpose of this project is primarily to provide civil infrastructure in advance of a related electrical project to replace the aged direct buried cross-linked polyethelene ("XLPE") cables on feeder SCNA47M13 within the Cedar Heights and Creative 2 subdivisions, in order to reduce the probability of a system failure.

Scope:

In the subdivision bounded by Meadowvale Road, Ellesmere Road, Dalmation Crescent, Winding Court, Choice Land Blvd and Graphic Court, new concrete-encased conduit will be installed to enclose the 1/0 tree-retardant cross-linked polythelene ("XLPE") cables to be installed along feeder NY51M24. In total, 2.2 kilometers of this civil infrastructure will be installed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	DALMATION & CHOICELAND
STATION(S)	SHEPPARD TS
FEEDER(S)	SCNA47M13

JUSTIFICATION

Project Background

Early vintage direct buried XLPE cables have been identified as being poor performing assets, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil; this has contributed to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently quality controls to (a) keep out impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have experienced high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth.

The assets within this particular area were installed in 1987 and a series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant XLPE cables. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			9
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,692	4,889	10,328
Feeder CMO ***(Cumulative)***	175,152	159,176	709,231

Benefits

- Upgrades equipment on one of the worst performing feeders (9th) in the THESL system that has a high FESI rank (6)
- Improves feeder reliability, due to replacement of direct buried infrastructure
- Reduces outage duration time due to capability of pulling cables through conduit during outage
- Improves renewal of asset infrastructure during outage, as assets can be replaced entirely (as opposed to direct buried cables, which can only be repaired via a splice)
- Improves mechanical protection against dig-ins and external events
- Improves operational flexibility and reliable supply
- Reconfigures the distribution system with the current THESL standard for operation and protection with 1/0 cable with standard fusing

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time of the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and the customers it supplies.

Deferral of this project also may result in future customer interruptions due to the potential failure of assets within this area. Cables installed in direct-buried configurations are prone to accelerated deterioration therefore the direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A42W from PILC to 500kcmil TRXLPE cable
Project Number:	18749
Project Year:	2013
Estimate Cost:	$ 4,242,090

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered (“PILC”) cable on the trunk of feeder A42W with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene (“TRXLPE”) cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 3600 m of varying size PILC cable to 500kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	WILTSHIRE
STATION(S)	WILTSHIRE TS
FEEDER(S)	A42W

JUSTIFICATION

Project Background

This project was initiated due to THESL’s Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers, due mainly to lead and Polychlorinated biphenyl (PCB) exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

A42W is also projected to be overloaded within the next ten years under first contingency conditions. Upgrading the existing PILC feeder trunk to 500kcmil TRXLPE cable will provide additional capacity on this feeder. This specific feeder was also chosen for upgrade because it contains belted-type PILC cable, which is the oldest PILC cable type in THESL's distribution system.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading PILC feeder whose trunk sizes are 350kcmil, with higher ampacity 500kcmil TRXLPE feeders
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks will continue for THESL workers due mainly to potential exposure to PCB’s and lead. If the lone North American manufacturer stops producing PILC cable, THESL will not only have a sourcing/procurement issue, but will also have a very large volume of PILC cable replacement projects to execute.

Portfolio:	Underground
Project Title:	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A52CS, A53CS and A54CS
Project Number:	13311
Project Year:	2013
Estimate Cost:	$3,257,540

PROJECT DESCRIPTION

Objective:

To inspect and rebuild cable chambers containing feeders A52CS, A52CS and A52CS. This work is necessary for replacement of Paper Insulated Lead Covered ("PILC") cable on the trunk of feeders A52CS, A52CS and A52CS to the standard 500kcmil Tree Retardant Cross-link Polyethylene ("TRXLPE") cable.

Scope:

The scope of this project is to inspect 51 cable chambers and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement and upgrade to 500 kcmil TRXLPE the existing PILC cable that runs through them. This cable replacement will be completed in projects14139, 15012 and 16004.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CHARLES
STATION(S)	CHARLES TS
FEEDER(S)	A52CS, A53CS, A54CS

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers due to THESL's Lead Cable Replacement Program with a vision to ultimately improve safety and environmental conditions within cable chambers, by eliminating lead and Polychlorinated biphenyls (PCB) exposure.

The cable chambers need to be rebuilt as age and environmental conditions have led to deteriorated civil structures. In addition, the rebuilt cable chambers will be larger in many cases. The additional space is necessary in cases where many feeders run through a chamber, as the TRXLPE cable and associated splices take more space than the PILC cable that is being replaced. Cable chambers for this project have installation dates as far back as 1957, and up to eight, 3-phase 13.8 kV feeders running through them. Inspections on these chambers indicate that twelve cable chambers are in very poor conditions, and have undersized ducts which will need to be upgraded to contain the larger, 500kcmil cable. The inspection and rebuilding of these cable chambers will enable the PILC cable replacement to occur safely.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load-transferring by upgrading PILC feeder whose trunk sizes are 350kcmil, with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Deteriorated civil conditions and limited space within the cable chambers will not allow for PILC cable replacement. Issues of health and environmental risks will continue for

THESL workers, due mainly to potential exposure to PCBs, and lead. If the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	UG Rehab of NY51M29 off Don Mills and Graydon Hall Drive
Project Number:	22049
Project Year:	2013
Estimate Cost:	$ 2,857,325

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace aged and vulnerable assets from the feeder in the Don Mills Road, Graydon Hall Drive and Duncan Mills area.

Scope:

The scope of this project is to construct the civil infrastructure to replace the direct buried loop distribution south of Millergrove Dr. This project will tap into the civil infrastructure to be built on a previous phase that will be constructed between Fisherville Rd and Millergrove Dr. This project requires the replacement of 13 submersible transformers, 2,600 m of primary underground 1/0 TRXLPE cable and 1,350 m of main ducts that serve aproximately 138 homes south of Millergrove Dr. This will improve the reliability and 7improve restoration time to these customers in the event of an outage.

This project involves replacement of assets that have passed their useful service life in an area bounded by Don Mills Rd, Duncan Mills Rd, Graydon Hall Dr and York Mills Rd. This project involves replacement of 3,800 m of primary cable, 38 switches and 14 transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DON MILLS & GRAYDON HALL
STATION(S)	LESLIE I TS
FEEDER(S)	NY51M29

JUSTIFICATION

Project Background

In the last four years, this feeder has experienced 15 sustained outages, 26% of them attributed to faulty underground cables. The vaults are aging and as a result, tracking on porcelain insulators is expected to increase the frequency of breakdowns and therefore outages.

This scope package addresses electrical rehabilitation work for the replacement of underground trunk and lateral cabling as well as poor performing assets in transformer vaults in the area of Don Mills road between Graydon Hall Drive and York Mills Road.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			60
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	84	633	4,998
Feeder CMO ***(Cumulative)***	6,564	45,999	124,455

Benefits

- Reinvigorates the distribution system by replacing the aging (40-year-old) underground trunk and lateral cabling and rehabilitating transformer vaults in the area off Don Mills Road between Graydon Hall Drive and York Mills Road
- Eliminates safety hazards to utility field staff
- Reduces equipment footprints and eliminates switching hazards as the switches in the project domain are to be replaced with sealed type SF6 equivalents and transformers replaced with current THESL standard units
- Improves switching due to the equipment replacement and response times after outages

IMPACT OF DEFERRAL

An outage on this feeder affects about 600 customers and causes a loss of up to 12MVA. Deferral of this project will lead to sustained or deteriorating reliability problems on the feeder and will increase the likelihood of outages in this area, as evidenced by the larger number of CMO (Customer Minutes Out) during the last three years. This leads to customer dissatisfaction and high reactive investment costs. It is evident that if this project is deferred, faults will continue and possibly increase in frequency, due to the deterioration and non-standard design of these aging assets.

Portfolio:	Underground
Project Title:	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A7B, A91B, and A93B
Project Number:	18506
Project Year:	2013
Estimate Cost:	$2,485,816

PROJECT DESCRIPTION

Objective:

To inspect and rebuild cable chambers containing feeders A7B, A91B and A93B. This work is necessary for replacement of Paper Insulated Lead Covered ("PILC") cable on the trunk of feeders A7B, A91B and A93B with the standard 500kcmil Tree Retardant Cross-link Polyethylene ("TRXLPE") cable.

Scope:

The scope of this project is to inspect 77 cable chambers and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement and upgrade to 500 kcmil TRXLPE, of the existing PILC cable that runs through them. This cable replacement will be completed in projects 13305, 13306 and 13307.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	BRIDGEMAN
STATION(S)	BRIDGEMAN TS
FEEDER(S)	A7B, A91B, A93B

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers due to THESL's Lead Cable Replacement Program with a vision to ultimately improve safety and environmental conditions within cable chambers, by eliminating lead and Polychlorinated biphenyls (PCB) exposure.

The cable chambers need to be rebuilt as age and environmental conditions have led to deteriorated civil structures. In addition, the rebuilt cable chambers will be larger in many cases. The additional space is necessary in cases where many feeders run through a chamber, as the TRXLPE cable and associated splices require more space than the PILC cable that is being replaced. Cable chambers for this project have installation dates dating back to 1952, and up to eight, 3-phase 13.8 kV feeders running through them. The inspection and rebuilding of these cable chambers will enable the PILC cable replacement to occur safely.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeder whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Deteriorated civil conditions and limited space within the cable chambers will not allow for PILC cable replacement. Issues of health and environmental risks would continue for THESL workers, due mainly to potential exposure to PCBs, and lead. Furthermore, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio: Underground

Project Title: 85M7 UG rebuild on Festival & Carnival

Project Number: 14133

Project Year: 2013

Estimate Cost: $2,102,179

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the underground distribution on Festival Drive & Carnival Court to improve reliability and faster restoration time to customers.

Scope:

The scope of this project is to construct the civil infrastructure to replace the non-standard, direct-buried loop distribution in an area bounded by Steeles Av.W, Carnival Ct, and Hidden trail. Reconfiguration of the supply points by replacing the dips on Steeles will improve restoration to more customers in the event of an outage. The secondary service will be replaced in ducts. This project requires replacement of 11 submersible transformers, 1,000 m of primary cable, 4,000 m of secondary service cable, 26 tap boxes and 5,000 m of underground ducts.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WESTMINSTER-BRANSON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M7

JUSTIFICATION

Project Background

Direct Buried cables were installed in the horseshoe area in the 70's and 80's. They are exposed to contamination because of the method of installation, and thus, premature failure. They are also difficult to fault locate and take a lengthy amount of time for power resoration. As part of the feeder reliability improvement initiative, THESL will replace the direct buried distribution plant; this will also improve operational flexibility.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			179
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,871	1,228	3,414
Feeder CMO ***(Cumulative)***	74,881	84,907	46,360

Benefits

- Replaces over 30- year-old direct buried cables that are at risk of failing
- Reconfigures the distribution system with the current THESL standard for operation and protection
- Delivers major improvements in feeder reliability as a result of rebuilding and optimally reconfiguring the lines for operational and reactive work
- Improves customer satisfaction as a result of greater service reliability
- Reduces emergency and reactive capital and maintenance costs due to significantly greater reliability
- Provides greater flexibility for power distribution and mechanical protection and durability of the underground cabling

IMPACT OF DEFERRAL

Deferral of this project will lead to sustained or deteriorating reliability problems on the feeder in question, leading to customer dissatisfaction and high reactive investment costs. This is due to the risk of increased component failures of aging direct buried cable. Furthermore, the configuration of the feeder has been altered by reactive replacements that have not optimized a design for operational flexibility, such as switching transformers and standard fusing. This will lead to more customers being affected by a fault. The proposed re-configuration will optimize restoration operations in the case of an outage on the feeder, thus reducing the number of customers affected.

Portfolio:	Underground
Project Title:	Northview Heights Civil Rebuild
Project Number:	13278
Project Year:	2013
Estimate Cost:	$2,059,490

PROJECT DESCRIPTION

Objective:

The purpose of this project is to build civil infrastructure to replace direct buried primary cable and improve reliability.

Scope:

The scope of work for this project is to install approximately 400 m of main duct to be constructed, 2,500 m of single duct to be constructed, 20 new submersible vaults and 70 tap boxes.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	NORTHVIEW HEIGHTS
STATION(S)	BATHURST TS
FEEDER(S)	85M4

JUSTIFICATION

Project Background

This project is intended to improve the reliability on 85M4. The feeder has experienced nine underground sustained interruptions in the Northview area since 2006, is ranked (FESI-6) and is listed on THESL’s April 2011WPF list. The cables in the area are direct buried. THESL’s records show that these assets were installed in 1986. This project involves the replacement of XLPE direct buried cable and submersible transformers in the area. The assets are old and have reached their end of life. Due to the condition of the assest, reliability in the Northview area is very poor.

Benefits

- Improves feeder reliability, thereby reducing both outage duration and frequency
- Improves upon the worsening SAIFI trend over the last couple of years due to equipment-related outages
- Reduces feeder outage by modernizing THESL'S distribution system
- Replaces primary assets at their end of service life
- Customer satisfaction will be increased
- Reduced customer minutes lost

IMPACT OF DEFERRAL

Customer Minutes Outage will be increased due to non switching capabilities of non-standard transformers in the area. If this project is deferred, the safety hazard and reliability of the distribution system will deteriorate. Electrical tree tracking will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. Furthermore, the existing cables that are direct-buried will be exposed to contamination and deterioration is accelerated.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A67E from PILC to 500kcmil TRXLPE cable
Project Number:	18932
Project Year:	2013
Estimate Cost:	$ 2,036,964

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered ("PILC") cable on the trunk of feeder A63E with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene ("TRXLPE") cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 3,823 m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A67E

JUSTIFICATION

Project Background

This project was initiated due to THESL's Lead Cable Replacement Program with a vision to ultimately improve safety and environmental conditions within cable chambers, due mainly to lead and Polychlorinated biphenyl (PCB) exposure.

Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE feeder, PILC feeder whose limiting trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks would continue for THESL workers due mainly to potential exposure to PCBs and lead. Additionally, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A51WR from PILC to 500kcmil TRXLPE cable
Project Number:	18803
Project Year:	2013
Estimate Cost:	$ 2,023,310

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered ("PILC") cable on the trunk of feeder A51WR with the standard 500 kcmil Tree-Retardant Cross-Linked Polyethylene ("TRXLPE") cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 2,200 m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	WINDSOR
STATION(S)	WINDSOR TS
FEEDER(S)	A51WR

JUSTIFICATION

Project Background

This project was initiated due to THESL's Lead Cable Replacement Program with a vision to ultimately improve safety and environmental conditions within cable chambers, due mainly to lead and Polychlorinated biphenyl PCB exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

In addition, A51WR is projected to be overloaded within the next ten years under first contingency conditions. Upgrading the existing PILC feeder trunk to 500kcmil TRXLPE will provide additional capacity on this feeder. This specific feeder was also chosen for upgrade because it contains belted-type PILC cable, which is the oldest PILC cable type in THESL's distribution system.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE feeders, PILC feeder whose trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks will continue for THESL workers due mainly to potential exposure to PCBs and lead. Moreover, the feeder is projected to be overloaded within the next ten years. Additionally, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Northview Heights Electrical Rebuild
Project Number:	13239
Project Year:	2013
Estimate Cost:	$2,012,738

PROJECT DESCRIPTION

Objective:
The purpose of this project is to improve the reliability by replacing direct buried primary cable and rebuilding the civil infrastructure.

Scope:
The scope of work for this project is to install 20 spans of overhead three-phase conductor, 20 new poles, 30 new submersible transformers, 400 m of 3-1/0 underground primary, 2,500 m of 1/0 underground primary and 12,000 m of secondary cabling. This project will address roughly 300 residential homes.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	NORTHVIEW HEIGHTS
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M4, NY85M24

JUSTIFICATION

Project Background
This project is intended to improve the reliability on 85M4. The feeder has experienced nine underground sustained interruptions in the Northview area since 2006, is ranked

(FESI-5) and is listed on THESL's April 2011WPF list. The cables in the area are direct buried. THESL's records show that these assets were installed in 1986. This project involves the replacement of XLPE direct buried cable and submersible transformers in the area. The assets are old and have reached their end of life. Due to the poor condition of the assest, the reliability in Northview area is deteriorating.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			90
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			7
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	9,585	3,250	88
Feeder CMO ***(Cumulative)***	328,516	87,034	8,168

Benefits

- Improves feeder reliability, thereby reducing both outage duration and frequency
- Improves upon the worsening SAIFI trend over the last couple of years due to equipment related outages
- Reduces feeder outage by modernizing THESL's distribution system
- Replaces primary assets at their end of service life
- Increases customer satisfaction
- Reduces customer minutes lost

IMPACT OF DEFERRAL:

Customer Minutes Outage would be increased due to non switching capabilities of non-standard transformers in the area. Outages due to overloaded transformers would increase. If this project were to be deferred, the potential safety hazard could increase and reliability would be poor. Furthermore, the existing cables that are direct-buried would be exposed to contamination and the resultant accelerated deterioration.

Portfolio:	Underground
Project Title:	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A77E, A78E, and A79E
Project Number:	13326
Project Year:	2013
Estimate Cost:	$1,964,204

PROJECT DESCRIPTION

Objective:

To inspect and rebuild cable chambers containing feeders A77E, A78E and A79E. This work is necessary for replacement of Paper Insulated Lead Covered ("PILC") cable on the trunk of feeders A77E, A78E and A79E to the standard 500 kcmil Tree Retardant Cross-link Polyethylene ("TRXLPE") cable.

Scope:

The scope of this project is to inspect 46 cable chambers and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement and upgrade of the existing PILC cable that runs through them with 500 kcmil TRXLPE. This cable replacement will be completed in projects 14199, 14192 and 14197.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A77E, A78E, A79E

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers, by eliminating lead and Polychlorinated biphenyls (PCB) exposure. The cable chambers need to be rebuilt as age and environmental conditions have led to deteriorated civil structures. The rebuilt cable chambers will be larger in many cases as the TRXLPE cable and associated splices occupy more space than the PILC cable that is being replaced. Cable chambers for this project have installation dates dating back to 1964, and up to eight, 3-phase 13.8 kV feeders running through them. The inspection and rebuilding of these cable chambers will enable the PILC cable replacement to occur safely

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE cable, PILC feeder whose trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Deteriorated civil conditions and limited space within the cable chambers will not allow for PILC cable replacement. Issues of health and environmental risks would continue for THESL workers, due mainly to potential exposure to PCBs, and lead. If the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A41GD, A47GD and A48GD
Project Number:	13316
Project Year:	2013
Estimate Cost:	$1,960,903

PROJECT DESCRIPTION

Objective:

To inspect and rebuild cable chambers containing feeders A41GD, A47GD and A48GD. This work is necessary for replacement of Paper Insulated Lead Covered ("PILC") cable on the trunk of feeders A41GD, A47GD and A48GD to the standard 500kcmil Tree Retardant Cross-link Polyethylene ("TRXLPE") cable.

Scope:

The scope of this project is to inspect 39 cable chambers and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement and upgrade of the existing PILC cable that runs through them to 500 kcmil TRXLPE. This cable replacement will be completed in projects 14156, 14157 and 14158.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	GEORGE AND DUKE
STATION(S)	GEORGE AND DUKE TS
FEEDER(S)	A41GD, A47GD, A48GD

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers, by eliminating lead and Polychlorinated biphenyls (PCB) exposure. The cable chambers need to be rebuilt as age and environmental conditions have led to deteriorated civil structures. In addition, the rebuilt cable chambers will be larger in many cases as the TRXLPE cable and associated splices occupy more space than the PILC cable that is being replaced. Cable chambers for this project have installation dates dating back to 1986, and up to nine, 3-phase 13.8 kV feeders running through them. The inspection and rebuilding of these cable chambers will enable the PILC cable replacement to occur safely.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE cable, PILC feeder whose trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Deteriorated civil conditions and limited space within the cable chambers will not allow for PILC cable replacement. Issues of health and environmental risks would continue for THESL workers, due mainly to potential exposure to PCBs, and lead. Additionally, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A63E from PILC to 500kcmil TRXLPE cable
Project Number:	18690
Project Year:	2013
Estimate Cost:	$ 1,921,362

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered ("PILC") cable on the trunk of feeder A63E with the standard 500 kcmil Tree-Retardant Cross-Linked Polyethylene ("TRXLPE") cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 3,040 m of varying size PILC cable, to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A63E

JUSTIFICATION

Project Background

This project was initiated due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers,

due mainly to lead and Polychlorinated biphenyl (PCB) exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable. Furthermore, A63E is projected to be overloaded within the next ten years under first contingency conditions. Upgrading the existing PILC feeder trunk to 500kcmil TRXLPE will provide additional capacity on this feeder.

This specific feeder was also chosen for upgrade because it contains belted-type PILC cable, which is the oldest PILC cable type in THESL's distribution system.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE feeder, PILC feeder whose limiting trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks would continue for THESL workers due mainly to potential exposure to PCBs and lead. Additionally, the feeder is projected to be overloaded within the next ten years. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Cable Chamber Location #6294 Piece out and PILC cable replacement
Project Number:	19798
Project Year:	2013
Estimate Cost:	$1,773,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to piece out and remove a number of cluttered and tangled cables and telecom wires within cable chamber 6294. This cable chamber is located at in the vicinity of 149 Front St W. between York St and Simcoe St. This work will return the cable chamber to safe and workable conditions so that new cables can be pulled and installed.

Scope:

The scope of work for this project is to build a new 6x4 duct bank on the north side of Front St. in order to relocate existing feeders from cable chamber 6294. The new duct bank is to begin at cable chamber 5922 and run west approximately 275 meters to cable chamber 5242.

Feeders A54WR, A58WR, A71WR and A72WR are to be rerouted from cable chamber 6294 to the new duct bank.

The remaining feeders and telecom cables in cable chamber 6294 are then to be pieced out and racked. Any spare or obsolete AILC cable is also to be removed and abandoned.

DISTRICT	TORONTO

DISTRICT NEIGHBOURHOOD	TRINTY – SPADINA
STATION(S)	WINDSOR TS
FEEDER(S)	A1WR, A2WR, A50WR, A51WR, A54WR, A58WR, A71WR, A72WR

JUSTIFICATION

Project Background

Cable chamber 6294 was rebuilt several years ago, however the existing feeders and telecom cables were not properly pieced out. As a result, any projects requiring access to this cable chamber are encountering work refusals by underground crews as it is cluttered with tangled telecom cables and feeders. Any new feeder installations for capital projects and/or customer connections are now faced with finding alternate routes using different duct banks and cable chambers in order to avoid accessing cable chamber 6294. This practice is inefficient and costly.

Benefits

- Removes all tangled and cluttered cables within the cable chamber 6294, thereby improving the safety and working conditions for crews
- Allows for the installation of new feeders for capital projects and customer connections

IMPACT OF DEFERRAL

If this project were to be deferred, any work requiring access into cable chamber 6294 will continue to be refused by THESL crews. This would result in engineers and designers having to design and plan alternate routes in order to supply customer demand which is inefficient, costly and time consuming.

Portfolio:	Underground
Project Title:	55M31 Underground Lateral Replacement Ph#2
Project Number:	13287
Project Year:	2013
Estimate Cost:	$1,698,278

PROJECT DESCRIPTION

Objective:

The purpose of this project is to improve the reliability on the feeder NY55M31 by replacing equipment that is non-standard or classified as at the end-of-life and is at risk of contributing to future outages for the commercial and industrial customers in this area.

Scope:

The scope of work for this project is to replace non-standard equipment and end-of-life assets in the neighburhood along Weston Road and Steeles Avenue West. This project is predominately focused on improving the underground lateral infrastructure of the area by addressing 22 poles, 17 transformers, 4,000 m of 1/0 TRXLPE underground conductor and the construction of civil infrastructure.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	HUMBER SUMMIT
STATION(S)	FINCH II TS
FEEDER(S)	NY55M31

JUSTIFICATION

Project Background

Primary cable is the major cause of power outages in the underground system. Due to the fact that underground equipment is mostly installed outdoors and operated in a harsh environment, it endures elements of nature such as dirt, road salt, water, moisture and condensation. The purpose of this project is to improve the reliability of 55M31 by replacing the XLPE underground cable. Historically this feeder has experienced outages due to the failling underground equipment. This planned replacement is necessary to mitigate risk of additional failures that will cause loss of power supply to customers.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			57
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,588	1,842	373
Feeder CMO ***(Cumulative)***	18,364	50,112	16,443

Benefits

- Increases reliability through the replacement of early vintage XLPE and optimally reconfiguring the system, thereby improving customer satisfaction
- Provides greater flexibility for power distribution and mechanical protection and durability of the underground cabling
- Reduces emergency and reactive capital and maintenance costs
- Upgrades equipment to current THESL standards

IMPACT OF DEFERRAL

Deferral of this project will lead to sustained or deteriorating reliability problems on the feeders in question due to aging and deteriorating overhead and underground plant, in turn leading to customer dissatisfaction and high reactive costs. This project affects 28 commercial and industrial customers and is primarily focused on their equipment supplying them on the feeder’s lateral. An outage may not affect a great number of customers but would have a consequential impact financially for their day-to-day business.

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Portfolio:	Underground
Project Title:	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A63E
Project Number:	20633
Project Year:	2013
Estimate Cost:	$1,685,587

PROJECT DESCRIPTION

Objective:

To inspect and rebuild cable chambers containing feeders A63E. This work is necessary for replacement of Paper Insulated Lead Covered (“PILC”) cable on the trunk of feeder A63E to the standard 500kcmil Tree Retardant Cross-link Polyethylene (“TRXLPE”) cable.

Scope:

The scope of this project is to inspect 36 cable chambers and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement and upgrade of the existing PILC cable that runs through them to 500 kcmil TRXLPE. This cable replacement will be completed in project X13132.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A63E

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers due to THESL's Lead Cable Replacement Program with a vision to ultimately improve safety and environmental conditions within cable chambers, by eliminating lead and Polychlorinated biphenyls (PCB) exposure. The cable chambers need to be rebuilt as age and environmental conditions have led to deteriorated civil structures. In addition, the rebuilt cable chambers will be larger in many cases as the TRXLPE cable and associated splices occupy more space than the PILC cable that is being replaced. Cable chambers for this project have installation dates dating back to 1953, and up to nine, 3-phase 13.8 kV feeders running through them. The inspection and rebuilding of these cable chambers will enable the PILC cable replacement to occur safely.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE cable, PILC feeder whose trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Deteriorated civil conditions and limited space within the cable chambers will not allow for PILC cable replacement. Issues of health and environmental risks would continue for THESL workers, due mainly to potential exposure to PCBs, and lead. Additionally, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	VC of Flemingdon MS feeders SS53-F3, F4, F5, F6 and F8 Electrical
Project Number:	20563
Project Year:	2013
Estimate Cost:	$ 1,683,508

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild the existing 13.8kV primary distribution system fed by the Flemingdon Park Municipal Substation by converting the outgoing feeders to 27.6kV system and replacing the aged, direct buried cables.

Scope:

The scope of this project involves conversion of existing 13.8kV feeders SS53F3, SS53F4,SS53F5, SS53F6 and SS53F8 to 27.6kV supplied by Bermondsey TS. All existing 13.8kV equipment will be removed and replaced with 27.6kV rated equipment as per THESL's current standard. In addition, existing direct buried cables serving the area will be replaced with cables installed in concrete-encased ducts. This project requires installation of 3 new pad mounted switches, replacement of 3 pad mounted switches, 49 transformers, refurbishment of 49 transformer vaults and replacement of 3,350 m of primary cable.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DON MILLS & EGLINTON
STATION(S)	FLEMINGDON MS & BERMONDSEY TS
FEEDER(S)	SS53F3,SS53F4,SS53F5,SS53F6,SS53F8

JUSTIFICATION

Project Background

Switchgear in Flemingdon MS was installed in 1961 with air blast circuit breakers. The overall switchgear age and the obsolence of the switching technology heighten the negative impact of the risk the station imposes on the area's distribution system. Furthermore, the existing substation is islanded with no opportunity for an external backup in the event of a contingency. To reduce maintenance costs from the station and to assure reliability of the overall distribution system, THESL proposes to modernize the area by converting to 27.6kV pursuant to THESL current standards and practices.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			193
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	654	1,123	282
Feeder CMO ***(Cumulative)***	41,279	54,729	44,588

Benefits

- Modernizes the local distribution system by replacing hardware on the aging distribution system
- Enables the decommissioning of the Flemingdon Park Substation that operates with air blast circuit breaker switchgear installed in 1961. The decommissioning of the substation deals with the obsolescence of the switching technology which heightens the negative impact of the risk the station imposes on the area's distribution system.
- Offers the distribution area the opportunity of external backup in the event of a contingency

IMPACT OF DEFERRAL

Deferral of this project would cause complications to the scheduled voltage conversion of other feeders from Flemingdon Park SS in the area as the substation is currently islanded and the outgoing feeders backed each other up. If this project were to be deferred, the feeders to be worked on (NYSS53F3,F4,F5, F6 and F8) would not have any backup feeder as the other feeders in the area are not at the same voltage level and would result in outages of lengthy duration. While this project is being deferred, an outage would affect about 600 customers and cause a loss of up to 14MVA.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A74DX from PILC to 500kcmil TRXLPE cable
Project Number:	19000
Project Year:	2013
Estimate Cost:	$ 1,680,754

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered ("PILC") cable on the trunk of feeder A74DX with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene ("TRXLPE") cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 2,135 m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	DUPLEX
STATION(S)	DUPLEX TS
FEEDER(S)	A74DX

JUSTIFICATION

Project Background

This project was initiated due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers,

due mainly to lead and Polychlorinated biphenyl (PCB) exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE feeder, PILC feeder whose limiting trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks would continue for THESL workers due mainly to potential exposure to PCBs and lead. Furthermore, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A74DX
Project Number:	20627
Project Year:	2013
Estimate Cost:	$1,640,815

PROJECT DESCRIPTION

Objective:

To inspect and rebuild cable chambers containing feeders A74DX. This work is necessary for replacement of Paper Insulated Lead Covered ("PILC") cable on the trunk of feeder A74DX to the standard 500kcmil Tree Retardant Cross-link Polyethylene ("TRXLPE") cable.

Scope:

The scope of this project is to inspect 42 cable chambers and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement and upgrade of the existing PILC cable that runs through them, to 500 kcmil TRXLPE. This cable replacement will be completed in project X11636.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DUPLEX
STATION(S)	DUPLEX TS
FEEDER(S)	A74DX

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers, by eliminating lead and Polychlorinated biphenyls (PCB) exposure. The cable chambers need to be rebuilt as age and environmental conditions have led to deteriorated civil structures. In addition, the rebuilt cable chambers will be larger in many cases, as the TRXLPE cable and associated splices occupy more space than the PILC cable that is being replaced. Cable chambers for this project have installation dates dating back to 1963, and up to thirteen, 3-phase 13.8 kV feeders running through them. The inspection and rebuilding of these cable chambers will enable the PILC cable replacement to occur safely.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE cable, PILC feeder whose trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Deteriorated civil conditions and limited space within the cable chambers will not allow for PILC cable replacement. Issues of health and environmental risks would continue for THESL workers, due mainly to potential exposure to PCBs, and lead. Additionally, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A43W from PILC to 500kcmil TRXLPE cable
Project Number:	19011
Project Year:	2013
Estimate Cost:	$ 1,535,602

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered ("PILC") cable on the trunk of feeder A43W with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene ("TRXLPE") cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 3,850 m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	WILTSHIRE
STATION(S)	WILTSHIRE TS
FEEDER(S)	A43W

JUSTIFICATION

Project Background

This project was initiated due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers,

due mainly to lead and Polychlorinated biphenyl (PCB) exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable. Moreover, this specific feeder was also chosen for upgrade because it contains belted-type PILC cable, which is the oldest PILC cable type in THESL's distribution system.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE feeder, PILC feeder whose limiting trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks would continue for THESL workers due mainly to potential exposure to PCBs and lead. Additionally, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Rebuild Cable Chambers and Duct Structures along Millwood and Laird
Project Number:	21439
Project Year:	2013
Estimate Cost:	$1,479,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to inspect and rebuild cable chambers containing feeders from Leaside TS. This work is necessary for replacement of Paper Insulated Lead Covered (“PILC”) cable on the trunk of Leaside TS feeders to the standard 500kcmil Tree Retardant Cross-link Polyethylene (“TRXLPE”) cable.

Scope:

The scope of this project is to inspect approximately 20 cable chambers along Village Station Road, Millwood Road and Laird Drive and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement and upgrade the existing PILC cable that runs through them to 500 kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	LEASIDE
STATION(S)	LEASIDE TS
FEEDER(S)	A1L, A2L, A3L, A4L, A11L, A14L, A27L, A28L

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers, by eliminating lead and Polychlorinated biphenyls (PCB) exposure. The cable chambers need to be rebuilt as age and environmental conditions have led to deteriorated civil structures. In addition, the rebuilt cable chambers will be larger in many cases, as the TRXLPE cable and associated splices occupy more space than the PILC cable that is being replaced. Cable chambers for this project have installation dates back to 1963, and up to ten, 3-phase 27.6 kV feeders running through them. The inspection and rebuilding of these cable chambers will enable the PILC cable replacement to occur safely.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE cable, PILC feeder whose trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Deteriorated civil conditions and limited space within the cable chambers will not allow for PILC cable replacement. Issues of health and environmental risks would continue for THESL workers, due mainly to potential exposure to PCBs, and lead. Additionally, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Ironside Crescent UG Rehab SCNAR26M21
Project Number:	22616
Project Year:	2013
Estimate Cost:	$ 1,470,530

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild old building vault electrical infrastructure and replace air-insulated switches on a portion of feeder SCNAR26M21 containing aged direct buried cable, which has experienced four failures and has passed its useful life span. This will prevent future negative impact to customers due to equipment failure.

Scope:

The scope of work for this project is to replace air-insulated switchgear and existing infrastructure in 21 building vaults in the Ironside Crescent industrial area. This portion of the feeder was identified as experiencing a significant amount of auto failures due to local environmental conditions (dust contamination). Three air-insulated pad mount switches in this area will also be replaced with sealed SF6 type pad mount switches pursuant to current THESL standards. This industrial area is experiencing significant growth and heavy loading so an additional pad mount switch will be required to appropriately distribute the additional loading.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	IRONSIDE
STATION(S)	MALVERN TS
FEEDER(S)	SCNAR26M21

JUSTIFICATION

Project Background

Feeder SCNAR26M21 has experienced four direct buried cable faults and 52 auto reclosures in the last three years. This area is currently being rebuilt under other projects with new cable in new concrete-encased ducts. The neighbourhood that is part of this direct buried cable rebuild is made up of industrial and commercial customers. The building vaults in this area were found to have dirty, aged and unreliable switchgear. This switchgear is to be replaced with the current THESL standard SF6 types. Pad mount switches will also be replaced with SF6 type.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			350
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4,156	2,733	23
Feeder CMO ***(Cumulative)***	43,257	159,121	12,387

Benefits

- Eliminates safety hazards to utility field-staff
- Reduces equipment footprints and eliminates switching hazards as the air-insulated switches in the project area are to be replaced with sealed type SF6 equivalents.
- Improves switching due to the equipment replacements, thereby improving response times after outages
- Targets achievement of better operational flexibility and more reliable supply

IMPACT OF DEFERRAL

Deferral may bring this project in conflict with those from other utilities or the newly imposed city moratorium. Deferral may also result in customer dissatisfaction from further sustained and auto-reclose outages.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A53B from PILC to 500kcmil TRXLPE cable
Project Number:	18684
Project Year:	2013
Estimate Cost:	$ 1,458,625

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered ("PILC") cable on the trunk of feeder A53B with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene ("TRXLPE") cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 1,190 m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	BRIDGMAN
STATION(S)	BRIDGMAN TS
FEEDER(S)	A53B

JUSTIFICATION

Project Background

This project was initiated due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers,

due mainly to lead and Polychlorinated biphenyl (PCB) exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable. This specific feeder was also chosen for upgrade because it contains belted-type PILC cable, which is the oldest PILC cable type in THESL's distribution system.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE feeders, PILC feeder whose trunk sizes are 2/0 and 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks will continue for THESL workers due mainly to potential exposure to PCBs and lead. Furthermore, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Rehab of Transformers on SCNA502M24
Project Number:	20437
Project Year:	2013
Estimate Cost:	$ 1,454,583

PROJECT DESCRIPTION

Objective:

The purpose of this project is to increase stability of this feeder by replacing aging and high-risk transformers. This feeder has experienced five transformer failures in the last two years.

Scope:

The scope of work for this project is replace151 submersible transformers and termination accessories.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SHEPPARD & PHARMACY
STATION(S)	CAVANAUGH TS(27.6 KV)
FEEDER(S)	SCNA502M24

JUSTIFICATION

Project Background

There has been a trend of transformer failures on this feeder. THESL plans to replace 151 of these transformers based on their current age,condition and loading. This project will improve the reliability of the feeder and the supply to customers bringing the ditribution system to the THESL's standard.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			80
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	8,231	10,108	6,144
Feeder CMO ***(Cumulative)***	59,906	200,078	149,988

Benefits

- Modernizes the system by replacing aged padmount and submersible transformers to the latest THESL standard
- Mitigates the risk of further outages as a result of deteriorating and failing equipment

IMPACT OF DEFERRAL

If this project were deferred, THESL would lose the opportunity to replace aging, deteriorating assets in the system and modernize the distribution to current THESL standard. Moreover, THESL would also face a greater risk of sustained or increasing outages as is evident by the increasing trend in CI and CMO.

Portfolio:	Underground
Project Title:	Rebuild UG Trunk NT63M12 M8 Brimley -Civil
Project Number:	21868
Project Year:	2013
Estimate Cost:	$ 1,407,192

PROJECT DESCRIPTION

Objective:

The objective of this project is primarily to provide civil infrastructure to replace the old, direct buried 750 kcmil (and also 350 kcmil) with 1,000 kcmil aluminum cable in concrete-encased duct along Brimley Road from Steeles Avenue to Finch Avenue to proactively reduce the probability of a system failure, by replacing the aged direct buried cross-linked polyethelene ("XLPE") cables. This project is one phase of a multi-phase program to establish a true feeder tie between NT63M12 and M8 with the upgrading of standard size of cable on feeder mains. This part of the project deals with civil work only.

Scope:

The scope of work for this project is to design and construct the civil infrastructure for the replacement of direct buried undersized cable running along Brimley Rd. THESL standards will be applied in the design and construction and selection of materials. In total, 3.01km of duct will be installed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	BRINMLY
STATION(S)	AGINCOURT TS
FEEDER(S)	SCNT63M12

JUSTIFICATION

Project Background

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, thereby contributing to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new XLPE cable. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors. The work will address a stretch of undersized cable, built direct buried, connecting feeders NT63M12 and M8 running along Brimley Rd from Steeles Ave to McNicoll Avenue and then from McNicoll Avenue to Finch Avenue.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			2
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	7,971	16,463	1,686
Feeder CMO ***(Cumulative)***	185,746	732,101	364,363

Benefits

- Replaces a section of undersized cable of two feeder that were direct buried
- Increases the capacity of the feeder mains to normal standards
- Replaces aging direct buried cables that are at risk of failing
- Improves the reliability of the feeder through the upgrading of equipment on one of the worst performing feeders (2) in THESL's system that has a high FESI rank (9)
- Increases operational flexibility by establishing a true feeder tie between NT63M8 and M12
- Increases feeder capacity through the upgrading of standard size of cable on feeder main
- Improves system protection through the reconfiguring of the distribution for the latest THESL standard for operation and protection standard fusing

IMPACT OF DEFERRAL

Deferral of the project would expose the feeder to increased numbers of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time of the existing non-tree retardant XLPE cable. This would result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration.

Deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the City and other utilities.

Portfolio:	Underground
Project Title:	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A67E
Project Number:	20631
Project Year:	2013
Estimate Cost:	$1,385,352

PROJECT DESCRIPTION

Objective:

To inspect and rebuild cable chambers containing feeders A67E. This work is necessary for replacement of Paper Insulated Lead Covered (“PILC”) cable on the trunk of feeder A67E to the standard 500kcmil Tree Retardant Cross-link Polyethylene (“TRXLPE”) cable.

Scope:

The scope of this project is to inspect 50 cable chambers and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement and upgrade the existing PILC cable that runs through them, to 500 kcmil TRXLPE. This cable replacement will be completed in project X13133.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A67E

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers, by eliminating lead and Polychlorinated biphenyls (PCB) exposure.

The cable chambers need to be rebuilt as age and environmental conditions have led to deteriorated civil structures. In addition, the rebuilt cable chambers will be larger in many cases, as the TRXLPE cable and associated splices occupy more space than the PILC cable that is being replaced. Cable chambers for this project have installation dates dating back to 1953, and up to nine, 3-phase 13.8 kV feeders running through them. The inspection and rebuilding of these cable chambers will enable the PILC cable replacement to occur safely.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE cable, PILC feeders whose trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Deteriorated civil conditions and limited space within the cable chambers will not allow for PILC cable replacement. Issues of health and environmental risks would continue for THESL workers, due mainly to potential exposure to PCBs, and lead. Furthermore, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Rebuild of NY51M4 Consumers Rd & Victoria Park Areas - Electrical NY51M4
Project Number:	20733
Project Year:	2013
Estimate Cost:	$ 1,346,580

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace aged and failing assets along the feeder NY51M4 to proactively prevent a rise in number of outages.

Scope:

This project replaces aged assets (42 years old) that have reached or passed their useful service life, that are connected to feeder NY51M4 in the area bounded by Victoria Park Av, Finch Av, Don Mills Rd, and Consumers Rd. This requires the refurbishment of 1 vault, replacement of 4,400 m of primary cable, three overhead switches, six pole reframes and installation of three new overhead switches.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	VICTORIA PARK & CONSUMERS
STATION(S)	LESLIE I TS
FEEDER(S)	NY51M4

JUSTIFICATION

Project Background

In the last ten years, there were 39 sustained outages on the feeder with CI=24,256 and CMO=688,176. Within the last 12 months feeder NY51M4 experienced six outages. The Worst Performing Feeder rank deteriorated from 19 to 16 and considering the mean time (four months) between failures of the feeder equipment, more failures are expected to occur. Other projects were packaged to address the issues that caused the six outages in the last 12 months, handle the construction of associated concrete encased ducts, and replace line-post porcelain insulators & failing poles. This project addresses vintage asset areas of the feeder, which have experienced faults in the last ten years.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			140
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,580	829	7,039
Feeder CMO ***(Cumulative)***	28,015	9,717	93,300

Benefits

- Reinvigorates the distribution system by replacing the aging (40 year-old) direct buried cables, aging switchgear and rehabilitating transformer vaults in the area around the Consumers road and Victoria Park intersection.
- Improves switching due to the equipment replacement, thereby improving response times after outages

IMPACT OF DEFERRAL

Deferral of this project would cause more outages to occur in the area. Delay of this project worsens the safety risks to utility staff and to community members as the pole framing is in very poor condition. The direct buried cables are subject to contamination, thus pre-mature failure. Direct buried cables are also difficult to fault locate and this leads to large restoration times due to the difficulty to replace or repair these components, which in turn leads to customer dissatisfaction and high reactive investment costs.

Portfolio:	Underground
Project Title:	55M31 Underground Lateral Replacement Ph#1
Project Number:	13284
Project Year:	2013
Estimate Cost:	$1,312,770

PROJECT DESCRIPTION

Objective:

The purpose of this project is to improve reliability on feeder NY55M3 by replacing equipment that is non-standard or classified as end-of-life and is at risk of contributing to future outages for the commercial and industrial customers in this area.

Scope:

The scope of work for this project is to replace non-standard equipment and end-of-life assets in the neighburhood along Weston Rd. and Steeles Ave. West. The scope of this project is predominately focused on improving the underground lateral infrastructure of this area by addressing 14 poles, 13 underground transformers, 3,000 m of 1/0 TRXLPE underground conductor as well as the construction of civil infrastructure.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	HUMBER SUMMIT
STATION(S)	FINCH II TS
FEEDER(S)	NY55M31

JUSTIFICATION

Project Background

Primary cable is the major cause of power outages in the underground system. Due to the fact that underground equipment is mostly installed outdoors and operated in harsh environment, it endures elements of natrue such as dirt, road salt, water, moisture and condensation. The purpose of this project is to improve the reliability of 55M31 by replacing the XLPE underground cable. Historically this feeder has experienced outages due to the failling underground equipment. This planned replacement is necessary to mitigate the risk of additional failirues that will cause loss of power supply to customers.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			57
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1588	1842	373
Feeder CMO ***(Cumulative)***	18364	50112	16443

Benefits

- Increases reliability through the replacement of early vintage XLPE and optimally reconfiguring the system, thereby improving customer satisfaction
- Provides greater flexibility for power distribution and mechanical protection and durability of the underground cabling
- Reduces emergency and reactive capital and maintenance costs
- Upgrades equipment to current THESL standards

IMPACT OF DEFERRAL

The deferral of this project will generally lead to sustained or deteriorating reliability problems on the feeders in question due to aging and deteriorating overhead and underground plant. This will lead to customer dissatisfaction and high reactive costs. This project affects 15 commercial and industrial customers and is primarily focused on their equipment supplying them on the feeder’s lateral. An outage may not affect a great number of customers but due to the necessity of power, would have a consequential impact financially for their day-to-day business.

Portfolio:	Underground
Project Title:	UG Rebuild R26M34 Melford Customer Vaults
Project Number:	22718
Project Year:	2013
Estimate Cost:	$ 1,285,169

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated wall mounted primary switches (with SF6 type indoor SWGR or mini-rupters as applicable) in the customer vaults of Melford industrial area.

Scope:

The scope of work for this project is to replace 46 primary switches with SF6 switchgear or mini-rupter arrangement in the customer vaults based on the latest THESL standard. 14 SF6 type switchgear will be installed in vaults with transformers of 750kVA or more. For the vaults of smaller size transformers (less than 750kVA), 18 mini-rupter type switches will be installed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MELFORD DRIVE
STATION(S)	MALVERN TS
FEEDER(S)	SCNAR26M34

JUSTIFICATION

Project Background

The three phase distribution in the Melford industrial area was built in 1974. In 2009 the old and failing direct buried cables were replaced by new standard cables in concrete encased ducts. Due to recent failures of the old wall mounted primary switches in customer vaults, THESL plans to replace the old and deteriorated wall mounted primary switches (with SF6 type indoor SWGR or mini-rupters) in Melford industrial area customer vaults.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			46
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			7
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,592	1,183	9,101
Feeder CMO ***(Cumulative)***	539,714	433,255	334,045

Benefits

- Replaces the old and deteriorated wall mounted primary switches with modern SF6 type indoor switchgear or mini-rupters in the customer vaults of Melford industrial area
- Targets achievement of better operational flexibility and more reliable supply
- Upgrades equipment on one of the worst performing feeders in THESL's system that has a high FESI rank (7)
- Addresses industrial/commercial distribution that has experienced high fault currents during failure

IMPACT OF DEFERRAL

Deferral of this project would cause more outages to occur in the area, as well as frequent failures of the old and deteriorated wall mounted primary switches are. Outages to the customers fed by these vault switches would have a financial impact to their day-to-day business and lead to customer dissatisfaction.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A44W from PILC to 500kcmil TRXLPE cable
Project Number:	19019
Project Year:	2013
Estimate Cost:	$ 1,277,973

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered ("PILC") cable on the trunk of feeder A44W with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene ("TRXLPE") cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 3,190 m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	WILTSHIRE
STATION(S)	WILTSHIRE TS
FEEDER(S)	A44W

JUSTIFICATION

Project Background

This project was initiated due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers,

due mainly to lead and Polychlorinated biphenyl (PCB) exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable. This specific feeder was also chosen for upgrade because it contains belted-type PILC cable, which is the oldest PILC cable type in THESL's distribution system.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE feeder, PILC feeder whose limiting trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks would continue for THESL workers due mainly to potential exposure to PCBs and lead. Additionally, f the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Rebuild Tallpine Subd and Durnford TH 47M17-Civil
Project Number:	20209
Project Year:	2013
Estimate Cost:	$ 1,276,574

PROJECT DESCRIPTION

Objective:

The purpose of this project is primarily to provide civil infrastructure in advance of the related electrical project that will proactively reduce the probability of a system failure by replacing the aged direct buried cross-linked polyethelene ("XLPE") cables on feeder SCNA47M17 within the area along Vandorf Street, Tallpines Court, John Graham Court, Sheppard Avenue, Raycliff Court, Shallice Court, Porthclair Court, Parsborough Court, Rylander Boulevard, Tideswell Boulevard, Carlisle Crescent and Durnford Road to the internal roads of the THESL-owned complex.

Scope:

The scope of work for this project is to install new concrete-encased conduit to enclose the XLPE cables on feeder SCNA47M17 along the streets of Vandorf Street, Tallpines Court, John Graham Court, Sheppard Avenue, Raycliff Court, Shallice Court, Porthclair Court, Parsborough Court, Rylander Boulevard, Tideswell Boulevard, Carlisle Crescent and Durnford Road. In total, 2.4 kilometers of this civil infrastructure will be installed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	DURNFORD
STATION(S)	SHEPPARD TS
FEEDER(S)	SCNA47M17

JUSTIFICATION

Project Background

Early vintage direct buried XLPE cables have been identified as being poor performing assets, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have experienced high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. The assets within this particular area were installed in 1985 and have exceeded their useful life. The purpose of this project is to install the concrete-encased conduits necessary to house the new XLPE cables. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			63
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	9,360	7,260	7,740
Feeder CMO ***(Cumulative)***	603,103	114,973	198,324

Benefits

- Improves feeder reliability, due to replacement of direct buried infrastructure
- Reduces outage duration time due to capability of pulling cables through conduit during outage
- Improves renewal of asset infrastructure during outage, as assets can be replaced entirely (as opposed to direct buried cables, which can only be repaired via a splice)
- Improves mechanical protection against dig-ins and external events
- Improves operational flexibility and reliable supply

IMPACT OF DEFERRAL

Deferral of the project would expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing would lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This would result in further outages to this feeder and to its customers. Also, cables in direct-buried configurations are prone to accelerated deterioration.

Portfolio:	Underground
Project Title:	Starview / Rockbank UG Rehab
Project Number:	13162
Project Year:	2013
Estimate Cost:	$1,274,021

PROJECT DESCRIPTION

Objective:

To install the civil infrastructure required to eliminate the existing direct buried distribution system within the Rockbank / Starview area to improve reliability; replace the primary direct buried UG feeder 55M21 with TRXLPE cable between primary service riser poles #93 and #100 Highbury; and replace all six submersible transformers within the project area.

Scope:

The scope of work for this project requires the replacement of direct buried primary (1-1/C, 1/O, Al, 28kV, XLPE) with 1-1/C, 1/O, Al, 28kV, TRXLPE cable between pole #93 Highbury and pole #100 Highbury and provide for normally closed fuses at the dip poles with a normally open point in the middle of the loop. Also, six submersible transformer locations (UT61266, UT89580, UT79197, UT70394, UT45955 and UT96277) will be replaced.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	STARVIEW-ROCKBAND
STATION(S)	FINCH II TS
FEEDER(S)	NY55M21

JUSTIFICATION

Project Background

Early vintage XLPE cable has been identified as poor performing cable. As such, THESL is proactively replacing this type of cable. This cable is installed in a non-standard fashion; namely directly buried, which configuration causes pre-mature failure as a result of contamination. Although information about the condition of the transformers is not available, records indicate they were installed in 1979. Completion of the proposed work will lead to improvement in system reliability by reducing feeder outage duration time and frequency.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			247
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1297	844	1254
Feeder CMO ***(Cumulative)***	60313	45176	42972

Benefits

- Modernizes the distribution plant as a result of replacement of poor performing cable
- Reduces the probability of more failures on the feeder with the replacement of non-tree-retardant XLPE cable with new TRXLPE cables as per THESL standard
- Reduces Customer Minutes Out due to improved restoration time achieved through the replacement of vault transformers with switchable units
- Improves safety on the feeders as the vaults along the feeder routes will be

refurbished and upgraded to the latest THESL standard

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased numbers of outages due to poor performing equipment. Electrical tree tracking will lead to the eventual insulation breakdown of the existing non-tree retardant XLPE cable, resulting in further outages to this feeder and its customers. Also, cables installed in direct-buried configurations are prone to accelerated deterioration.

Portfolio: Underground

Project Title: Arrow Rd - Lateral UG Loop Replacement

Project Number: 13193

Project Year: 2013

Estimate Cost: $ 1,268,029

PROJECT DESCRIPTION

Objective:

To replace direct buried XLPE primary cable loop along Deerhide Crescent, Arrow Road and Pemican Court with TRXLPE cable on feeder 55M21, with current construction standards using concrete-encased duct structures. Transformers that have been identified as reaching end-of-life based on available asset condition data will be replaced.

Scope:

The scope of this project is predominately focused on improving the underground lateral infrastructure of this area by installing 2,500 m of 3-1/0 underground primary, 1,000 m concrete encased ducts and eight vault transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	ARROW
STATION(S)	FINCH II TS
FEEDER(S)	NY55M21

JUSTIFICATION

Project Background

Early vintage XLPE has been identified as poor performing cable. It was introduced during the 1970's and is showing signs of failure. As such, THESL is proactively replacing this type of cable. This will improve system reliability and reduce feeder outage duration time and frequency.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			247
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,297	844	1,254
Feeder CMO ***(Cumulative)***	60,313	45,176	42,972

Benefits

- Modernizes the distribution plant as a result of replacement of poor performing cable
- Reduces the probability of more failures on the feeder with the replacement of XLPE cable with tree retardant TRXLPE cable as per THESL standard
- Reduces Customer Minutes Out due to improved restoration time achieved through the replacement of vault transformers with switchable units
- Improves safety on the feeders as the vaults along the feeder routes will be refurbished and upgraded to the latest THESL standard.

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical tree tracking will lead to the eventual insulation breakdown on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and its customers, leading to customer dissatisfaction and high reactive investment costs.

Portfolio: Underground

Project Title: 51M22, 51M4 UG rehab off Sheppard & Victoria Park Intersection-Electrical

Project Number: 22492

Project Year: 2013

Estimate Cost: $ 1,235,965

PROJECT DESCRIPTION

Objective:

The object of this project is to replace vulnerable assets along the feeders to prevent a rise in the number of outages in the area.

Scope:

This project involves replacement of aged and assets that have reached or passed their useful service life, connected to feeder NY51M4 and 51M22, in the area bonded by Victoria Park Av, Patrick Blvd, Yorkland Rd, and Yorkland Blvd. Existing overhead and underground switches will be removed and replaced with new switches as per current THESL standard. Existing underground direct buried cables and connected equipment that have reached end of service life also will be removed and replaced per current standard.

DISTRICT	North York
DISTRICT NEIGHBOURHOOD	Sheppard Avenue East & Victoria Park Avenue
STATION(S)	Leslie 1 - TS
FEEDER(S)	NY51M22; NY51M4

JUSTIFICATION

Project Background

Feeder NY51M4 has experienced six outages within the last 12 months. The Worst Performing Feeder rank deteriorated from 19 to 16 and considering the mean time (four months) between failures of the feeder equipment more failures are expected to occur imminently. The sub-lateral distribution off Victoria Park Avenue into the Patrick Blvd and Hazelnut Crescent is currently not well configured for switching when outages occur and there is a need to isolate faulted locations. As a result, the CMO counts have been very high in this area.

The distribution area is being reconfigured by this scope package, to improve switching by detaching the cabling that goes along Hazelnut Crescent from the feeder NY51M4 and adding it to the feeder NY51M22. This would mean the two existing loops in the area will be combined into a single large loop supplied by NY51M22 on Brian Drive.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			112
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2784	3617	9212
Feeder CMO ***(Cumulative)***	146174	114504	199529

Benefits

- Improves switching as this project reconfigures the sub-lateral distribution by detaching the cabling that goes along Hazelnut Crescent from the feeder NY51M4 and adding it to the feeder NY51M22 enabling the two existing loops in the area to be combined into a single large loop supplied by NY51M22 on Brian Drive

- Simplifies the distribution loops thereby reducing the need for PMH switchgear, in turn reducing the overall opportunities for failure along the feeder
- Improves reliability as concrete encased cabling has a much lower probability of failure
- Improves safety of utility field staff and customers in the community as electrical hazards are eliminated with the upgrade and cleanup of the transformer vaults
- The SF6 switch replacements allow for smaller sized and safer-to-operate field equipment

IMPACT OF DEFERRAL

Deferral of this project would increase the likelihood of outages and as over 80% of outages on this feeder in the last 12 months and in the last four years have been on underground cabling that is being targeted in this project. While this project is being deferred, an outage would affect about 1,500 customers and cause a loss of up to 20MVA.

Portfolio:	Underground
Project Title:	NY51M24 UG Rebuild in Subdivision by Don Mills & Sheppard Part 2 - Civill NY51M24
Project Number:	21434
Project Year:	2013
Estimate Cost:	$ 1,196,414

PROJECT DESCRIPTION

Objective:

The purpose of this project is to provide civil infrastructure in advance of the related electrical project to reduce the probability of a system failure by replacing the aged direct buried cables of feeder NY51M24 in the subdivision located southwest of the Don Mills Road and Sheppard Avenue intersection.

Scope:

The scope of this project is to install concrete encased ducts in the subdivision bounded by Sheppard Avenue to the north, Shaughnessy Boulevard to the West, Havenbrook Boulevard to the South and Don Mills Road to the East for feeder 51M24. This is the civil portion of the project to replace 6,750 m of 1/0 TRXLPE direct buried cable.

DISTRICT	North York
DISTRICT NEIGHBOURHOOD	Don Mills Road & Sheppard Avenue East
STATION(S)	Leslie II TS
FEEDER(S)	NY51M24

JUSTIFICATION

Project Background

This feeder has had seven outages in the last 12 months with cable failure as the primary cause. Cable faults are being addressed in this project by replacing aged, direct buried XLPE cables including #1 solid types found at various segments of the feeder.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			65
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,141	4,337	6,265
Feeder CMO ***(Cumulative)***	129,367	211,103	324,587

Benefits

- Replaces 30 year old direct buried cables that are at risk of failing
- Improves customer satisfaction as a result of greater service reliability
- Reduces emergency and reactive capital and maintenance costs due to significantly greater reliability
- Provides greater flexibility for power distribution and mechanical protection and durability of the underground cabling

IMPACT OF DEFERRAL

Deferral of the project would prevent completion of the construction of the concrete duct banks before the new underground cabling is installed and may cause the other project (underground cabling rebuild) to stall exposing the feeder to further outages due to lack of timely replacement of the failing assets. While this project is being deferred, an outage would affect about 400 residential customers. In addition, deferral of the project would exposes it to the risk of encountering conflicts with the work schedules of other utilities in the environment as well as the increased risks of encountering new moratorium constraints imposed by the city administration.

Portfolio:	Underground
Project Title:	Replace/Upgrade cable from PILC to 500 TRXLPE on A-91-B
Project Number:	13306
Project Year:	2013
Estimate Cost:	$1,185,296

PROJECT DESCRIPTION

Objective:

To replace all Paper Insulated Lead Covered ("PILC") cable on the trunk of feeder A91B to the standard 500kcmil Tree Retardant Cross-link Polyethylene ("TRXLPE") cable

Scope:

This project would enable the replacement and upgrade the existing 3,039 meters of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	BRIDGEMAN
STATION(S)	BRIDGEMAN TS
FEEDER(S)	A91B

JUSTIFICATION

Project Background

This project was initiated due to THESL's Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers,

due mainly to lead and Polychlorinated biphenyls (PCB) exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable. This specific feeder was also chosen for upgrade because calculations show that after future expansion, the feeder will be overloaded under a first contingency situation. Upgrading this feeder will allow additional future expansion as additional loads can be connected to this feeder without overloading it.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE cable, PILC feeder whose trunk sizes are 2/0 or 350kcmil. This specific feeder will no longer be overloaded after this upgrade. Also, the customer load increase on this feeder can be approved after this upgrade
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks will continue for THESL workers, due mainly to potential exposure to PCBs, and lead. If the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue. Additionally, there is no additional room for expansion to serve customers connected to this feeder.

Portfolio:	Underground
Project Title:	Venture Drive UG Rebuild Electrical SCNT47M1
Project Number:	20059
Project Year:	2013
Estimate Cost:	$ 1,135,981

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild a portion of Feeder SCNT47M1 out of Sheppard TS to improve reliability and prevent future negative impact to customers. This project will replace aging direct buried cables in this industrial/commercial area with new cables in concrete encased duct.

Scope:

The scope of work for this project is to replace the existing direct buried cables with new, 1,000 Al. kcmil and new 3 phase Al 1/0 cable in concrete-encased duct in an area bounded by Water Tower Gate, Venture Drive and Casebridge Court. This project will require replacement of 5,000 m of primary cable and one transformer, refurbishing of 15 transformer vaults and installation of one new overhead switch and one new pad mounted switch.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	VENTURE
STATION(S)	SHEPPARD TS
FEEDER(S)	SCNT47M1

JUSTIFICATION

Project Background

Feeder NT47M1 is one of the worst performing feeders among THESL's 1,400 feeders. The direct buried cable in this area was installed in 1983 andis due for replacement based on life cycle information for this type of cable.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			55
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	14,377	6,436	11,039
Feeder CMO ***(Cumulative)***	503,619	209,555	429,752

Benefits

- Replaces old direct buried cables (27 years) that are at risk of failing on one of the worst performing feeders
- Rebuilds the industrial/commercial distribution system experiencing high fault currents during failure
- Reconfigures the distribution system with the latest THESL standard for operation and protection with TRXLPE cable in concrete encased duct and smaller loops with standard fuse
- Targets achievement of better operational flexibility and more reliable supply
- Optimizes restoration operations in the case of an outage on the feeder, thus reducing the number of customers affected

IMPACT OF DEFERRAL

Deferral of this project would lead to sustained or deteriorating reliability problems on the feeder in question, leading to customer dissatisfaction and high reactive investment costs. This is due to the risk of increased component failures of aging direct buried cable. Furthermore, the configuration of the feeder has been altered by reactive replacements that have not optimized a design for operational flexibility, such as switching transformers and standard fusing. This will lead to more customers being affected by a fault.

Portfolio:	Underground
Project Title:	Windsor TS Load Transfer to Bremner TS
Project Number:	18648
Project Year:	2013
Estimate Cost:	$1,115,308

PROJECT DESCRIPTION

Objective:

The purpose of this project is to transfer feeders from the existing switchgears at Windsor TS to the new switchgear at Bremner TS. By accomplishing these feeder transfers, two benefits are achieved. First, the newly constructed Bremner TS will now be energized and put into service. Second, the space made available by transferring the existing Windsor TS feeders will allow for the decommissioning and upgrading of older switchgears at Windsor TS. In total, 14 feeders from three different switchgears at Windsor TS are to be transferred to the new switchgear at Bremner TS.

Scope:

The scope of work for this project is to install the required cable and transition joints in the new civil infrastructure (to be built in 2012) in order to transfer six feeders from switchgear A17-18WR, five feeders from switchgear A13-14WR and three feeders on switchgear A5-6WR. After these transfers are accomplished, the five remaining feeders on switchgear A17-18WR are to be transferred to switchgear A13-14WR. This will result in an empty switchgear that can now be taken out of service and upgraded.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	TRINITY-SPADINA
STATION(S)	WINDSOR TS & BREMNER TS
FEEDER(S)	A3WR, A5WR, A36WR, A38WR, A40WR, A42WR, A44WR, A77WR, A90WR, A91WR, A92WR, A93WR, A94WR, A98WR, A99WR

JUSTIFICATION

Project Background

Windsor TS was built in 1950 and has since expanded to become one of the largest 13.8kV substations in Toronto. The station switchgear and breaker equipment are approaching end-of-life and a new source of supply is required to facilitate maintenance work and rebuild of the station. In addition, significant new loads are anticipated in the coming years, along the Toronto Waterfront area. As a result, Bremner TS was planned in order to offload Windsor TS and provide a new source of supply for future anticipated demand.

Benefits

- Enables Bremner TS to begin supplying load, putting into service the transformers and switchgear at the station
- Offloads Windsor TS, allowing for the decommissioning and upgrade of the existing switchgears

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would have invested millions of dollars and constructed a new Transformer Station which would be not put into service immediately. In addition, this would delay the decommissioning and upgrade of existing switchgears at

Windsor TS, thereby increasing the risk of a significant station outage due to the threat of failed equipment.

Portfolio:	Underground
Project Title:	Middlefield Passmore StateCrown Electrical SCNAR26M21
Project Number:	20925
Project Year:	2013
Estimate Cost:	$ 1,100,286

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild a portion of feeder SCNAR26M21containing aged direct buried cable which has passed its useful life span, in order to prevent future negative impact to customers due to equipment failure.

Scope:

The scope of work for this project is to replace existing direct buried cable with new cable installed in concrete encased ducts in an area bounded by Select Avenue, Passmore Avenue and State Crown Blvd. This project requires the replacement of 25,000 m of primary cable and installation of two new pad mount SF6 switches.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MIDDLEFIELD & PASSMORE
STATION(S)	MALVERN TS
FEEDER(S)	SCNAR26M21

JUSTIFICATION

Project Background

Feeder SCNAR26M21 has experienced 10 direct buried cable faults in the last four years. The neighbourhood that is part of this direct buried cable rebuild is made up of industrial/commercial customers. The direct buried cable in this area is 32 years old and is past due for replacement based on life cycle information for this type of cable.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			350
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4156	2733	23
Feeder CMO ***(Cumulative)***	43257	159121	12387

Benefits

- Replaces old direct buried cables (32 years) to prevent future negative impact to customers due to direct buried XLPE cable which has exceeded its useful lifespan and is at risk of failure
- Reconfigures the distribution for the latest THESL standard for operation and protection
- Reconfigures area to achieve better operational flexibility and more reliable supply

IMPACT OF DEFERRAL

Delays in this work could lead to an increased risk of equipment failures and outages to customers. Deferral may bring this project in conflict with projects from other utilities or newly imposed city moratorium as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A20DX from PILC to 500kcmil TRXLPE cable
Project Number:	18503
Project Year:	2013
Estimate Cost:	$ 1,085,881

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered (“PILC”) cable on the trunk of feeder A42W with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene (“TRXLPE”) cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 770m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	DUPLEX
STATION(S)	DUPLEX TS
FEEDER(S)	A20DX

JUSTIFICATION

Project Background

This project was initiated due to THESL’s Lead Cable Replacement Program, with a vision to ultimately improve safety and environmental conditions within cable chambers, due mainly to lead and Polychlorinated biphenyl (PCB) exposure. Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable. A51WR is also projected to be overloaded within the next ten years under first contingency conditions. Upgrading the existing PILC feeder trunk to 500kcmil TRXLPE will provide additional capacity on this feeder.

Benefits

- Removes risk of harmful effects of lead and potential PCB oil exposure
- Increases capacity for projected load growth and flexibility for load transferring by upgrading with higher ampacity 500kcmil TRXLPE feeders, PILC feeder whose trunk sizes are 350kcmil
- Addresses procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks will continue for THESL workers due mainly to potential exposure to PCBs and lead. The feeder is projected to be overloaded within the next ten years. Additionally, if the lone North American manufacturer stops producing PILC cable, THESL will have a sourcing/procurement issue.

Portfolio:	Underground
Project Title:	Nashdene Tiffield SCNAR26M22 UG Rebuild - Civil
Project Number:	20335
Project Year:	2013
Estimate Cost:	$ 1,073,369

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the underground distribution system in this industrial neighbourhood. This is the civil portion of a multi-phase program to replace aging direct buried XLPE cable. The purpose of the civil portion is to install concrete encased duct to enable replacement of aging direct buried XLPE cable and improve the infrastructure of this industrial neighbourhood.

Scope:

The scope of work for this project is to design and construct civil infrastructure for the rebuild of the underground distribution in the area of Nashdene Road, Tiffield Road and Dynamic Drive. This will enable replacement of the existing direct buried cables with cable in concrete encased ducts and distribution up to latest THESL standards. Installing civil infrastructure for four PMHs is included in this poject. Also 2.550 km of concrete encased duct is included.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	NASHDENE & TIFFIELD
STATION(S)	MALVERN TS
FEEDER(S)	SCNAR26M22

JUSTIFICATION

Project Background

This project will rebuild a portion of Feeder NAR26M22 out of Malvern TS to prevent future negative impact to customers. The direct buried cable in this neighbourhood is 32 years old and is past its estimated operation lifespan based on lifecycle information for this type of cable. This feeder was part of a distribution transfer from feeder NAR26M34 and is a new feeder, thus historical feeder performance data is unavailable. Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have experienced high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant XLPE cable. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Benefits

- Replaces old direct buried cables (32 years) to prevent future negative impact to customers due to direct buried XLPE cable which has exceeded its useful lifespan and is at risk of failure

- Reconfigures the distribution for the latest THESL standard for operation and protection. TRXLPE cable in concrete encased duct and smaller loops with standard fuse.

IMPACT OF DEFERRAL

If this project is deferred, the electrical component of this project cannot be executed without the completion of this civil work - either in the same year or electrical in the immediate next year. Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration.

The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Rebuild UG Trunk 502M21-28 Warden -Civil
Project Number:	21933
Project Year:	2013
Estimate Cost:	$ 1,066,157

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old direct buried 750kcmil (and also 350kcmil) with 1,000 kcmil aluminum cable in concrete encased duct along Warden Avenue from Steeles Avenue to Hydro One right-of-way (ROW) South of McNicoll Avenue. This project will establish a true feeder tie between NA502M21 and M28 with the upgrading of standard size of cable on feeder mains. This project is one phase of a multi-phase program to replace the underground cable on the above feeders.

Scope:

The scope of work for this project is to design and install civil infrastructure for the three phase 1000 TRXLPE Al cables along Warden Avenue from switch OS90517 at Steeles-Warden to switch OS87103 at Warden- Hydro One ROW. The scope of work also includes the design and installation of civil infrastructure to loop in all three-phase loads- GBP, CXY, WBS, DRT, QBN, LTQ, 693TV and DHE. This project includes installing 2.25 km of duct.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	WARDEN
STATION(S)	CAVANAUGH TS
FEEDER(S)	SCNA502M21, SCNA502M28

JUSTIFICATION

Project Background

There is a stretch of undersized cable, built direct buried, connecting feeders NA502M21 and M28 running along Warden Avenue from Steeles Avenue to Hydro One ROW South of McNicoll Avenue. To bring the capacity and reliability of the feeders and the system to THESL standard, THESL plans to carry out this project and the related electrical component in 2013 and 2014 respectively.

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have experienced high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant XLPE cable. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			121
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	13,567	13,617	8,639
Feeder CMO ***(Cumulative)***	827,586	356,182	401,534

Benefits

- Replaces direct buried cables that are at risk of failing
- Reconfigures the distribution system with the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Replaces a section of undersized cable of two feeders (502M21 and M28) built direct buried,
- Increases operational flexibility through the establishing of a true feeder tie between NA502M21 and M28
- Increases capacity with the upgrading of standard size of cable

IMPACT OF DEFERRAL

The electrical component of this project cannot be executed without the completion of this civil work - either in the same year or electrical in the immediate next year. Deferral of the project would expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown of the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, cables installed in direct-buried configurations are prone to accelerated deterioration.

Deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area would continue to degrade, resulting in potential insulation failure. This would lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the City and other utilities.

Portfolio:	Underground
Project Title:	UG Cable Rehab on Antibes / Torresdale
Project Number:	12464
Project Year:	2013
Estimate Cost:	$1,053,543

PROJECT DESCRIPTION

Objective:

To redesign the distribution system surrounding the Antibes, Torresdale, Bathurst area by reconfiguring loops and replacing XLPE cable with 1/0 Al, 28kV, TRXLPE cable.

Scope:

The scope of work for this project entails reconfiguration of THESL plant in the Bathurst and Antibes area. All underground XLPE cable that is direct buried and all transformers in poor condition will be replaced to standard . Furthermore, the 3 phase and single phase loops will be reconfigured so that they are distinct loops. This project requires replacement of 1,850 m of primary cable, refurbishing of 10 transformer vaults, replacement of seven transformers and installation of 620 m of concrete-encased ducts.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BATHURST-ANTIBES
STATION(S)	FAIRCHILD I TS
FEEDER(S)	NY80M2

JUSTIFICATION

Project Background

Early vintage XLPE has been identified as poor performing cable. It was introduced during the 1970's and is showing signs of failure. As such, THESL is proactively replacing this type of cable. This will improve system reliability, as well as reduce feeder outage duration time and frequency. This area contains assets that have passed their useful service life as well as sub-standard feeder configuration that would impede the timely switching capability of feeders when needed.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			69
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4,228	2,050	7,978
Feeder CMO ***(Cumulative)***	113,919	23,671	327,430

Benefits

- Modernizes the distribution plant as a result of replacement of non-standard and poor performing assets
- Reduces Customer Minutes Out by separating the single and three phase loops
- Improves Customers Interrupted due to reconfiguration of lateral supplies to area

IMPACT OF DEFERRAL

Deferral of the project would expose the feeder to increased nubers of outages due to poor performing and non-standard equipment. Also, non-standard design configuration of THESL plant would contribute to higher risk of lengthy outages. The deferral of this worst performing feeder project will lead to sustained or deteriorating reliability problems on the feeders in question, leading to customer dissatisfaction and high reactive investment costs.

Portfolio:	Underground
Project Title:	Lynmont /Milkwood - UG Rehab & VC
Project Number:	12258
Project Year:	2013
Estimate Cost:	$1,051,997

PROJECT DESCRIPTION

Objective:

The purpose of this project is to improve the service reliability in the Lynmont, Milkwood, Alicewood, Turnvale, Four Leaf area of Etobicoke by replacing and converting the front lot direct buried electrical equipment of Albion MS MG-F3 to Rexdale TS R29M33.

Scope:

The scope of work for this project requires the replacement of 3,600 m of primary cable and replacement of 30 underground transformers in order to feed customers at Lynmont/Milkwood. This project also includes cabling work to upgrade from 4kV to 27.6k to convert approximately 330 residential customers.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	LYNMONT/MILKWOOD
STATION(S)	REXDALE TS
FEEDER(S)	ETR29M33

JUSTIFICATION

Project Background

Existing equipment installed in Albion M.S. MG-F3 supplying the general area of Lynmont / Milkwood has been problematic and causing extensive power outages in the area. To improve service reliability, THESL proposes to rebuild the area by replacing the direct buried distribution and upgrading the area to present day standards, including primary distribution at 27.6kV within concrete encased conduit. This project is part of a series of projects leading to the decommissioning of the Albion M.S.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			238
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,958	9,217	3,733
Feeder CMO ***(Cumulative)***	38,478	770,554	44,796

Benefits

- Higher primary voltage lowers line losses and improves transmission efficiency.
- Replaces aging 4kV infrastructure and converting to a higher voltage provides more reliability due to new equipment
- Helps remove obsolete breaker and switchgear equipment in the MS station
- Increases customer satisfaction

IMPACT OF DEFERRAL

Delay or postponement of this planned capital program would lead to unplanned power outages from failure of aged or unreliable equipment, causing an increase in customer outage duration. Failure could cause station feeder breaker to lockout, losing power to all customers supplied by the feeder. Due to the nature of direct buried installation, fault locating is lengthy in most cases and repair work is very disruptive to the neighbourhood as it involves breaking up roads and/or sidewalks. As a result, failures from direct buried cable contribute greatly to total CI (Customer Interrupted) and CHI (Customer Hour Interrupted) counts.

Portfolio:	Underground
Project Title:	NY51M24 UG Rebuild in Subdivision by Don Mills & Sheppard Part 1 - Civill NY51M24
Project Number:	21433
Project Year:	2013
Estimate Cost:	$ 1,010,069

PROJECT DESCRIPTION

Objective:

The purpose of this project is primarily to provide civil infrastructure in advance of the related electrical project that will proactively reduce the probability of a system failure by replacing the aged direct buried cabling of feeder NY51M24 in the subdivision located southwest of the Don Mills Road and Sheppard Avenue intersection. This project is one phase of a multiphase program to replace the primary cable in the Henry Farm neighborhood due to the presence of cross-linked-polyethelene ("XLPE") cable.

Scope:

The scope of this project involves the following: The project boundaries are in the subdivision bounded by Sheppard Avenue to the north, Shaughnessy Boulevard to the East, Havenbrook Boulevard to the South and Leslie Street to the West. This project involves the installation of concrete encased ducts to enclose 1/0-28kV Insulated Stranded (STR) Aluminum (AL) Tree-retardant cross-linked polyethelene ("TRXLPE") 1-phase cables along feeder 51M24.

Also this project involves upgrading the cable chambers and the transformer vaults to current standards by replacing all existing devices, cables and any other components that may prove unreliable due to age and/or conditions. This project encompasses approximately 5.5km of duct.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DON MILLS & SHEPPARD
STATION(S)	LESLIE II TS
FEEDER(S)	NY51M24

JUSTIFICATION

Project Background

This feeder has had seven outages in the last 12 months with cable failure as the primary cause of power outages. Cable faults are being addressed in this project by replacing aged, direct buried cabling including #1 solid types found at various segments of the feeder. Aged and rather unreliable switchgears are already being replaced by two projects in the area in 2011. Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have experienced high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant XLPE cable. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			65
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,141	4,337	6,265
Feeder CMO ***(Cumulative)***	129,367	211,103	324,587

Benefits

- Replaces aging direct buried cables that are at risk of failing
- Increases long term reliability of the subdivision with the construction of new concrete encasements that will provide mechanical protection to the insulation of the new cables and prevent puncture damages by dig-ins and deterioration due to backfill pressure and heat
- Reconfigures the distribution system with the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Increases access to cable for installation, repairs, and replacement of cabling in the event of outages thereby improving response time, and reduces safety hazards to utility personnel and the surrounding community

IMPACT OF DEFERRAL

The electrical component of this project cannot be executed without the completion of this civil work. Deferral of the project would expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown of the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, cables in direct-buried configurations are prone to accelerated deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Clappison 47M17 UG Rebuild- Civil
Project Number:	18320
Project Year:	2013
Estimate Cost:	$ 1,002,181

PROJECT DESCRIPTION

Objective:

The purpose of this project is primarily to provide civil infrastructure in advance of the related electrical project that will proactively reduce the probability of a system failure by replacing the aged direct buried cross-linked polyethelene ("XLPE") cables on feeder SCNA47M17 within the Centennial Park II subdivision.

Scope:

In the subdivision bounded by Conference Boulevard, Clappison Boulevard, Chapais Crescent, Elkwood Drive and Shea Court, new concrete-encased conduit will be installed to enclose the tree-retardant XLPE cables to be installed along feeder SCNA47M17. In total, 2.7 kilometers of this civil infrastructure will be installed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	CLAPPISON
STATION(S)	SHEPPARD TS
FEEDER(S)	SCNA47M17

JUSTIFICATION

Project Background

Early vintage direct buried XLPE cables have been identified as being poor performing assets, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have experienced high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. The assets within this particular area were installed in 1969. Some of these assets were replaced in 1992 with new direct buried infrastructure. Feeder NA47M17 remains one of the worst performing feeders, and has had nine sustained interruptions over the past twelve month period.

The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant XLPE cables. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			63
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	9,360	7,260	7,740
Feeder CMO ***(Cumulative)***	603,103	114,973	198,324

Benefits

- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Upgrades equipment on one of the worst performing feeders in THESLs' system that has a high FESI rank (9)
- Improves feeder reliability, due to replacement of direct buried infrastructure
- Reduces outage duration time due to capability of pulling cables through conduit during outage
- Improves renewal of asset infrastructure during outage, as assets can be replaced entirely (as opposed to direct buried cables, which can only be repaired via a splice)
- Improves mechanical protection against dig-ins and external events
- Improves operational flexibility and reliable supply

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased numbers of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown of the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration.

Deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs.

Portfolio:	Underground
Project Title:	McNicoll Maybrook SCNAR26M32 UG Rebuild – Electrical
Project Number:	20394
Project Year:	2013
Estimate Cost:	$ 948,902

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild a portion of feeder SCNAR26M32 containing aged direct buried XLPE cable which has passed its useful life span to prevent future negative impact to customers due to equipment failure.

Scope:

The scope of work for this project is to replace existing direct buried cable with new cable installed in concrete encased duct in an area bounded Dynamic Drive, McNicoll Avenue, Newmill Gate and Middlefield Road. This project requires the replacement of 20,000 m of primary cable, four air insulated pad mount switches with sealed SF6 type pad mount switches and two overhead SCADA switches will be installed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MCNICOLL & MAYBROOK
STATION(S)	MALVERN TS
FEEDER(S)	SCNAR26M32

JUSTIFICATION

Project Background

The neighbourhood that is part of this direct buried cable rebuild is made up of industrial/commercial customers. The direct buried cable in this area is 32 years old and is past due for replacement based on life cycle information for this type of cable.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			247
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,032	5	850
Feeder CMO ***(Cumulative)***	56,849	250	4,400

Benefits

- Replaces old direct buried cables (32 years) to prevent future negative impact to customers due to direct buried XLPE cable which has exceeded its useful lifespan and is at risk of failure.
- Reconfigures the distribution system for the latest THESL standard for operation and protection

IMPACT OF DEFERRAL

Delays of this project would lead to a higher risk of equipment failure and outages to customers, increasing customer dissatisfaction. Deferral may bring this project in conflict with projects from other utilities or newly imposed city moratorium as THESL has communicated this project to the City and other utilities.

Portfolio:	Underground
Project Title:	Rehab of Feeder NAE5-2M3 in McCowan and Kingston area (Civil)
Project Number:	20136
Project Year:	2013
Estimate Cost:	$ 906,935

PROJECT DESCRIPTION

Objective:

The purpose of this project is primarily to provide civil infrastructure in advance of the related electrical project that will proactively reduce the probability of a system failure by replacing the aged direct buried cross-linked polyethelene (“XLPE”) cables on feeder SCNAE5-2M3 within the McCowan Road and Kingston Road area.

Scope:

The scope of work for this project is to install new concrete-encased conduit to enclose the tree-retardant cross-linked polythelene (“XLPE”) cables on feeder SCNAE5-2M3 along the streets of Brimley and Danforth Roads – south of Eglinton Avenue; through Barbados Boulevard, McCowan Road and further south to areas off of Kingston Road between McCowan Road and Rockwood Drive, bonded by McNab Boulevard, Eglinton Avenue, Brimley Street and Kingston Road. In total, 1.9 kilometers of this civil infrastructure will be installed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MCCOWAN & KINGSTON
STATION(S)	NAE5, UA, SC, HB
FEEDER(S)	SCNAE5-2M3

JUSTIFICATION

Project Background

Early vintage direct buried XLPE cables have been identified as being poor performing assets, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. Feeder SCNAE5-2M3 has had five sustained interruptions over the past twelve month period.

The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant XLPE cable. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			182
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4,391	174	297
Feeder CMO ***(Cumulative)***	281,855	26,854	82,578

Benefits

- Improves feeder reliability, due to replacement of direct buried infrastructure
- Reduces outage duration time due to capability of pulling cables through conduit during outage
- Improves renewal of asset infrastructure during outage, as assets can be replaced entirely (as opposed to direct buried cables, which can only be repaired via a splice)
- Improves mechanical protection against dig-ins and external events
- Improves operational flexibility and reliable supply

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown of the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, cables installed in direct-buried configurations are prone to accelerated deterioration. Approximately 7.5 MVA of load, or 1,440 connected customers, will be at risk for a future sustained outage.

Portfolio:	Underground
Project Title:	Royal Rouge Trail UG Rebuild 47M17-Civil
Project Number:	20207
Project Year:	2013
Estimate Cost:	$ 884,853

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the old and failing direct-buried primary distribution of Deaunville (Royal Rouge) Subdivision supplied by feeder NA47M17. This project addresses the civil part only. This project is one phase in a multi-phase program to remove the direct-burried primary cable on NA47M17.

Scope:

The scope of work for this project is to design and install civil infrastructure for the rebuild of the area covered by NA47M17: Atrium Lane, Royal Rouge Trail, Polo Place, Nature Pathway, Calibre Court, Oak Knolls Crescent, Raspberry Road and a very small section of Kingston Rd. west of Sheppard Ave. It would also involve replacing the existing, direct buried primary cable with cable in concrete encased ducts and distribution standards to current THESL standards. This project involves installing 2.1 km of civil duct.

DISTRICT	Scarborough
DISTRICT NEIGHBOURHOOD	Sheppard Avenue East & Vandorf Street
STATION(S)	Sheppard TS (27.6 kV)
FEEDER(S)	SCNA47M17

JUSTIFICATION

Project Background

This single-phase distribution for the Deaunville (Royal Rouge) Subdivision was built in 1985 with direct-buried cables. The distribution system has experienced a number of cables, elbow and transformer failures over the recent past years.

To improve the reliability and bring the distribution to the latest and modern THESL standards, THESL will rebuild the primary distribution plant with concrete-encased cables and THESL standard transformers .

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have experienced high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant XLPE cable. These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			63
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	9,360	7,260	7,740
Feeder CMO ***(Cumulative)***	603,103	114,973	198,324

Benefits

- Replaces aging direct buried cables that are at risk of failing
- Upgrades equipment on one of the worst performing feeders in THESL's system that has a high FESI rank (9)
- Reconfigures the distribution system for the latest THESL standard for operation and protection with 1/0 cable with standard fusing

IMPACT OF DEFERRAL

The electrical component of this project cannot be executed without the completion of this civil work. Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown of the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, cables installed in direct-buried configurations are prone to accelerated deterioration.

The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the City and other utilities.

Portfolio: Underground

Project Title: Strachan Civil Egress Phase 1

Project Number: 21715

Project Year: 2013

Estimate Cost: $883,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to build a new civil egress and civil infrastructure out of Strachan TS. The civil infrastructure should have enough racking and/or space to accommodate the feeders for a double duct bank configuration from Strachan TS. The new civil egress would allow the feeders to exit the station on Manitoba Dr south of the Gardiner Expressway.

Scope:

The scope of work for this project is to build a new station egress point at the west side of the north Strachan TS building. From the new egress point, two new 6x4 duct banks, for a total of 48 new ducts, are to be constructed along the north side of Manitoba Dr. The new civil infrastructure will run approximately 250 meters along Manitoba Dr and be capped on the south limit of the Metrolink/CN rail boundaries.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	EXHIBITION PLACE
STATION(S)	STRACHAN TS
FEEDER(S)	A10T, A12T, A46T, A47T, A48T, A54T, A56T, A57T, A58T

JUSTIFICATION

Project Background

The area bounded by Queen St, Tecumseth St, Wellington St. and Sudbury St. are serviced via Strachan TS through the feeders A10T, A12T, A46T, A47T, A48T, A56T, A54T, A57T, A58T and various 4kV feeders. These feeders originate from Strachan TS and cross the CN rail tracks through three tunnels accessible by cable chambers 5067, 5069, 5110 and 5127 along Strachan Ave. This tunnel crossing is extremely deep and the cable chambers which access the tunnel are old and unsafe. These hazardous conditions have resulted in crews refusing to work within these chambers to install or remove any feeders. The new civil egress and infrastructure proposed will allow for the relocation of all feeders from the unsafe tunnel crossing so that it can be abandoned and/or rebuilt.

Benefits

- Creates a new route for feeders serving customers in Liberty Village, so that the existing route which is dangerous can be abandoned

IMPACT OF DEFERRAL

If this project were to be deferred, any work requiring access into the existing tunnel crossing Strachan Ave would continue to be refused by hydro crews. This will result in engineers and designers having to design and plan alternate routes in order to supply customer demand which is inefficient, costly and time consuming. The condition of the tunnel crossing is a growing reliability concern as it also prevents crews from removing or installing any cables. If any cables were to fail in the crossing, THESL customers would experience a prolonged outage.

Portfolio:	Underground
Project Title:	Nugget Avenue UG Rebuild Electrical SCNAH9M23
Project Number:	21664
Project Year:	2013
Estimate Cost:	$ 874,619

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild a portion of feeder SCNAH9M23 containing aged direct buried XLPE cable which has passed its useful life span to prevent future negative impact to customers due to equipment failure.

Scope:

The scope of work for this project is to replace the existing direct buried cables and bring the distribution system in this industrial area to the latest THESL standards in an area bounded by Shorting Road, Nugget Avenue and Dovedale Court. This project requires the replacement of 8,700 m of primary cable, three sealed SF6 type pad mount SCADA switches and refurbishment of 12 transformer vaults.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	NUGGET
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M23

JUSTIFICATION

Project Background

The direct buried XLPE cable in this industrial/commercial neighbourhood was installed in 1978 and has surpassed its estimated maximum useful lifespan of 25 years. The neighbourhood will be rebuilt with new 1/0 aluminum cables in concrete encased duct with SCADA switches for improved reliability.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			204
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	397	1,963	1,163
Feeder CMO ***(Cumulative)***	45,432	25,952	8,086

Benefits

- Replaces old direct buried cables (33 years) to prevent future negative impact to customers due to direct buried XLPE cable which has exceeded its useful lifespan and is at risk of failure
- Reconfigures the distribution system with the latest THESL standard for operation and protection

IMPACT OF DEFERRAL

Delays in this work would lead to a higher risk of equipment failure and outages to customers, increasing customer dissatisfaction. The assets are old and have reached their end-of-life. Thus, reliability will continue to deteriorate. Deferral may bring this project in conflict with projects from other utilities or newly imposed city moratorium as THESL has communicated this project to the City and other utilities.

Portfolio:	Underground
Project Title:	VC of Flemingdon MS feeders SS53-F3, F4, F5, F6 and F8 Civil
Project Number:	20564
Project Year:	2013
Estimate Cost:	$ 863,372

PROJECT DESCRIPTION

Objective:

The object of this project is to provide the necessary civil structures when rebuilding the aged, direct-burried primary distribution system fed by the Flemingdon Park Municipal Substation and converting to 27.6kV system. This project is one phase of a multi-phase program to remove the direct-burried primary system and convert the mentioned municipal substations.

Scope:

The scope of this project involves design and construction of concrete encased duct banks for the voltage coversion of feeders SS53-F3, F4, F5, F6 and F8 in an area bounded by Windy Golfway, Rochedort Drive, Don Mills Road and Vicora Linkway. Existing 13.8kV direct buried cable will be removed and replaced by 27.6kV TRXLPE cable installed in concrete encased ducts. This involves the installation of 3.1 km of duct.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	GATEWAY
STATION(S)	FLEMINGDON MS & BERMONDSEY TS
FEEDER(S)	SS53F3, SS53F4, SS53F5, SS53F6, SS53F8

JUSTIFICATION

Project Background

Switchgear in Flemingdon MS was installed in 1961 with air blast circuit breakers. The overall switchgear age and the obsolence of the switching technology heighten the negative impact of the risk the station imposes on the area's distribution system. Furthermore, the substation is islanded with no opportunity for an external backup in the event of a contingency. To reduce maintenance costs from the station and to assure reliability of the overall distribution system, THESL proposes to modernize the area by converting to 27.6kV by the latest THESL standards and practices.

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables lacked sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant cross-linked polyethylene ("XLPE"). These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			193
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	654	1,123	282
Feeder CMO ***(Cumulative)***	41,279	54,729	44,588

Benefits

- Replaces aging direct buried cables that are at risk of failing
- Increases long term reliability of the subdivision with the construction of new concrete encasements that will provide mechanical protection to the insulation of the new cables and prevent puncture damages by dig-ins and deterioration due to backfill pressure and heat.
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Increased access to cable for installation, repairs, and replacement of cabling in the event of outages thereby improving response time, and will reduce safety hazards to utility personnel and the surrounding community.

IMPACT OF DEFERRAL

If this project is deferred, the electrical component of this project cannot be executed without the completion of this civil work - either in the same year or electrical in the immediate next year. Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	UG Rebuild PJF2 Pastoria & Robert McIntosh SD-Civil
Project Number:	22212
Project Year:	2013
Estimate Cost:	$ 844,639

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated 13.8kV primary cables, installed direct buried in the time span of 1974 to 1975 in the area of Roydawn Court, Irvine Road, Acheson Boulevard, Byford Street, and Bathgate Drive. The area covers two subdivisions- Pastoria and Robert McIntosh. This part of the project deals with civil work only. This project is one phase of a multi-phase program to remove direct burried primary cable and convert Centenial D’arcy Magee MS.

Scope:

The scope of work is to design and install civil infrastructure for the single phase 1/0 aluminum cables along Roydawn Court, Irvine Road, Acheson Boulevard, Byford Street, Bathgate Drive, Ivan and Clyde Road. It would also involve replacing the existing, direct buried primary cable with cable in concrete encased ducts and distribution standards to current THESL standards.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	ROYDAWN COURT

STATION(S)	CENTENIAL D'ARCY MAGEE(13.8 KV)
FEEDER(S)	SCPJF2

JUSTIFICATION

Project Background

The distribution in the area of Roydawn Court, Irvine Road, Acheson Boulevard, Byford Street, and Bathgate Drive was built between 1974 to 1975 with direct buried cables. For improving the reliability and bringing the distribution to the latest and modern THESL standard, THESL will rebuild the subdivisions with cables in concrete encased duct.

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in corrosion and damage to the outer neutral conductors as well as contributing to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables did not have sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant cross-linked polyethylene (“XLPE”). These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			113
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,367	2,446	3,841
Feeder CMO ***(Cumulative)***	633,267	8,721	217,876

Benefits

- Replaces aging direct buried cables that are at risk of failing
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Increases long term reliability of the subdivision with the construction of new concrete encasements that will provide mechanical protection to the insulation of the new cables and prevent puncture damages by dig-ins and deterioration due to backfill pressure and heat.
- Increased access to cable for installation, repairs, and replacement of cabling in the event of outages thereby improving response time, and will reduce safety hazards to utility personnel and the surrounding community.

IMPACT OF DEFERRAL

If this project is deferred, the electrical component of this project cannot be executed without the completion of this civil work - either in the same year or electrical in the immediate next year. Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Rebuild Orange File SD 502M22 UG-Civil
Project Number:	21589
Project Year:	2013
Estimate Cost:	$ 834,987

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old direct buried primary cables in Orange File subdivision (in the area of Ivy Bush, Lapworh and Morbank) supplied by feeder NA502M22.

This project is one phase of a multi-phase program to replace the direct-buried primary cable on NA502M22. This part of the project deals with civil work only.

Scope:

The scope of work for this project is to design and install the civil infrastructure for rebuild of the area covered by NA502M22: Ivy Bush Ave, Lapworh Cres and Morbank Dr. It would also involve replacing the existing, direct buried primary cable with cable in concrete encased ducts and distribution standards to current THESL standards. This project includes installing approximately 2.4km of civil duct.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	IVY BUSH
STATION(S)	CAVANAUGH TS
FEEDER(S)	SCNA502M22

JUSTIFICATION

Project Background

The distribution in the area of Orange File subdivision was built in 1980 with direct buried cables. For improving the reliability and bringing the distribution to the latest and modern THESL standard, THESL will rebuild the subdivisions with cables in concrete encased duct.

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in corrosion and damage to the outer neutral conductors as well as contributing to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables did not have sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant cross-linked polyethylene (“XLPE”). These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			18
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			11
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,705	19,233	7,957
Feeder CMO ***(Cumulative)***	286,530	718,715	251,083

Benefits

- Replaces aging direct buried cables that are at risk of failing
- Upgrades equipment on one of the worst performing feeders (18th)in the THESL system that has a high FESI rank (11)
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Increases long term reliability of the subdivision with the construction of new concrete encasements that will provide mechanical protection to the insulation of the new cables and prevent puncture damages by dig-ins and deterioration due to backfill pressure and heat.
- Increased access to cable for installation, repairs, and replacement of cabling in the event of outages thereby improving response time, and will reduce safety hazards to utility personnel and the surrounding community.

IMPACT OF DEFERRAL

If this project is deferred, the electrical component of this project cannot be executed without the completion of this civil work - either in the same year or electrical in the immediate next year. Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	51M30 UG Rehab off Leslie Street North of Bond Avenue
Project Number:	21334
Project Year:	2013
Estimate Cost:	$ 824,877

PROJECT DESCRIPTION

Objective:

Replace the direct buried cable with 750kcmil XLPE cable between CC#MH993 - Dufferin / Katherine N/W corner and Bombardier plant (CO Switchgear Enclosure Loc.#CS).

Scope:

The scope of work for this project is to build new civil infrastructure north along Beffort then west along Hanover with an approximate distance of 900m, three new cable chambers will be required to accommodate the installation of 900m of 1,000kcmil TRXLPE cables. Furthermore, new 3-1,000kcmil TRXLPE and 1-300 neutral will be installed.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BOMBARDIER PLANT
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M1

JUSTIFICATION

Project Background

This project is intended to improve reliability of poorly performing feeders 85M1 (FESI-8). This feeder has experienced several sustained interruptions over the past couple of years and ranked 39th in the Worst performing feeder list. There is some outage due to cable between the OS17936 and COS9 on this feeder in the past years.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			169
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,596	178	341
Feeder CMO ***(Cumulative)***	181,878	22,483	110,225

Benefits

- Feeder reliability will be improved, reducing both outage duration and frequency.
- Reduces the probability of failure by modernizing the Toronto Hydro distribution system
- Primary assets at their end of service life will be replaced.
- Customer satisfaction will be increased
- Elimination of financial risk caused by damage to property and livelihood
- Improvement to grid operating conditions and will be avoided potential of second contingency scenarios

IMPACT OF DEFERRAL

If this project was to be deferred, safety hazards and reliability will continue to exist of this feeder will worsen. Deferral of this project wills high impact on customers minutes lost. Cables that are direct-buried installed are prone to contamination and thus deterioration in increased.

Portfolio:	Underground
Project Title:	UG DB Cable Rehab - Bombardier Supply
Project Number:	12490
Project Year:	2013
Estimate Cost:	$799,519

PROJECT DESCRIPTION

Objective:

Replace the direct buried cable in the area with 750kcmil XLPE cable between CC#MH993 - Dufferin / Katherine N/W corner and Bombardier plant (CO Switchgear Enclosure Loc.#CS).

Scope:

The scope of work for this project is to build new civil infrastructure north along Beffort then west along Hanover with an approximate distance of 900.0m, three new cable chambers will be required to accommodate the installation of 1,000kcmil TRXLPE cables. Furthermore, new 3-1,000kcmil TRXLPE and 1-300 neutral will be installed.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BOMBARDIER PLANT
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M1

JUSTIFICATION

Project Background

This project is intended to improve reliability of poorly performing feeders 85M1 (FESI-

8). This feeder has experienced sevral sustained interruptions over the past couple of years and ranked 39th in the Worst performing feeder list. There are some outage due to cable between the OS17936 and COS9 on this feederin the past years.

This project involves the replacement of Direct Buried XLPE cable between cable chamber MH#993 and Bombardier Plant (COS9) along the street Beffort Rd and Hanover Rd. There is XLPE cable in duct on Beffort Rd between MH#495and MH#993.In addition the cable between the OS17936 (Wilson Rd)and cable chamber MH#495 is 1000MCM TRXLPE cable. These cables are required to be highly reliable due to its high impact in the event of a failure. Furthermore, early vintage XLPE has been identified as a poor performing cable.

As such, THESL is proactively replacing this type of cable. In this way, there will be improvement to system reliability, as well reduce feeder outage duration time and frequency. At these locations the XLPE cable for feeder will be replaced and the cable will be in duct. Our record shows these assets are old and have poor historical poor reliability.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			169
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5596	178	341
Feeder CMO ***(Cumulative)***	181,878	22,483	110,225

Benefits

- Feeder reliability will be improved, reducing both outage duration and frequency.
- Reduces the probability of failure by modernizing the Toronto Hydro distribution system
- Primary assets at their end of service life will be replaced.
- Customer satisfaction will be increased
- Elimination of financial risk caused by damage to property and livelihood
- Improvement to grid operating conditions and will be avoided potential of second contingency scenarios

IMPACT OF DEFERRAL:

If this project was to be deferred, safety hazards and reliability will continue to exist of this feeder will worsen. Deferral of this project wills high impact on customers minutes lost. Cables that are direct-buried installed are prone to contamination and thus deterioration in increased.

Portfolio:	Underground
Project Title:	Ironside Crescent UG Rebuild Electrical SCNAR26M21
Project Number:	20990
Project Year:	2013
Estimate Cost:	$ 773,208

PROJECT DESCRIPTION

Objective:
The purpose of this project is to rebuild a portion of feeder SCNAR26M21 containing aged and failing direct buried cable. This is the electrical portion of this project

Scope:
The scope of work for this project is to install new 3 phase Al 1000 kcmil, 3 phase Al 1/0 cable and single phase Al 1/0 cable in concrete encased ducts installed in the civil portion of this project E13041. These structures were installed on Ironside Crescent, Tapscott Road and McNicoll Avenue. This will replace the existing direct buried cables and bring distribution in this industrial area to the latest THESL standards. This will also involve the installation of a new pad mount SF6 switch in suitable location to rearrange the distribution of loading.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	IRONSIDE
STATION(S)	MALVERN TS
FEEDER(S)	SCNAR26M21

JUSTIFICATION

Project Background

This project will rebuild a portion of feeder SCNAR26M21 out of Malvern TS to prevent future negative impact to customers due to equipment failure. The direct buried cable in this industrial/commercial neighbourhood is 32 years old and is past its estimated operation lifespan based on lifecycle information for this type of cable. Feeder SCNAR26M21 has experienced 4 direct buried cable faults in the last 3 years.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			350
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4156	2733	23
Feeder CMO ***(Cumulative)***	43257	159121	12387

Benefits

- Replaces old direct buried cables (32 years) to prevent future negative impact to customers due to direct buried XLPE cable which has exceeded its useful lifespan and is at risk of failure.
- Reconfigures the distribution for the latest THESL standard for operation and protection. TRXLPE cable in concrete encased duct and smaller loops with standard fuse.

IMPACT OF DEFERRAL

If this project was deferred, the deferral goes in tandem with civil part of the project - either same year or electrical the immediate next year. Delays in this work could also lead to a higher risk of equipment failure and outages to customers, increasing customer dissatisfaction. Deferral may bring this project in conflict with projects from other utilities or newly imposed city moratorium as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	PPEast 2013 Feeder Automation Project on SCNT63M3
Project Number:	23154
Project Year:	2013
Estimate Cost:	$ 765,611

PROJECT DESCRIPTION

Objective:

Feeder Automation on the Cavanaugh Feeder SCNT63M3

Scope:

The scope of this project involves installation and upgrade of SCADA controlled switches on feeder SCNT63M3 to enable automation for timely power restoration in the event of failure. This project requires the installation or upgrade of 6 SCADA-controlled switches.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SILVER SPRINGS
STATION(S)	AGINCOURT TS
FEEDER(S)	SCNT63M3

JUSTIFICATION

Project Background

Toronto Hydro has successfully implemented a 10 feeder automation scheme in 2010 with satisfactory performance. The same technology is planned to be implemented across the 27.6kV looped distribution system for reliability improvement.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			24
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	225	210	4,244
Feeder CMO ***(Cumulative)***	30,323	37,716	564,030

Benefits

- The project introduces two new tie points to the feeder 63M3:one from 502M25 through the padmount switch PS56875 at 317 Silver Springs Blvd. and a second through the new pad mount switch "PSC-1" at the intersection of Dancy and Silver Springs Blvd.
- The project installs automated switches which will allow automatic recovery of power to customers in the event of an outage with minimal response time thereby reducing Customer Minute Outage (CMO) counts.

IMPACT OF DEFERRAL

Deferral will complicate the scheduling of related feeder automation projects on adjacent feeders jeopardizing the functionality of the overall feeder automation scheme. This will also negate the positive work Toronto Hydro has done in the past years in the area of smart grid and feeder automation to deliver quality service and reliability to Toronto Hydro customers.

Portfolio:	Underground
Project Title:	NYSS53F7 Wynford Dr. UG Rebuild Civil Works
Project Number:	20312
Project Year:	2013
Estimate Cost:	$ 758,689

PROJECT DESCRIPTION

Objective:

This purpose of this project is to provide the necessary civil structures for the replacement of direct-burried cables to tree-retardant cross-link polyethelene cable (TRXLPE) on NYSS53 during the conversions to 27.6kV. This project is one phase of a multi-phase program to remove the direct-burried primary cable and convert 4kV loads, with the final objective to decomission Flemingdon MS.

Scope:

The scope of this project involves design and construction of concrete encased duct banks for the voltage conversion of feeders SS53-F7 in an area bounded by Wynford Drive, Don Valley Parkway and Eglinton Avenue East. Existing 13.8kV direct buried cables will be removed and replaced by 27.6kV TRXLPE cables installed in concrete encased ducts. This project includes the installation of approximately 1.6 km civil duct.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WYNFORD
STATION(S)	FLEMINGDON MS
FEEDER(S)	NYSS53-F7

JUSTIFICATION

Project Background

Flemingdon Park M.S., SS53-F7 feeder was installed in the 1960s with direct buried cables and NX switches. Parts of the feeder are encased in concrete ducts to cater for major road crossings and the rocky terrain.

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in corrosion and damage to the outer neutral conductors as well as contributing to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables did not have sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant cross-linked polyethylene ("XLPE"). These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE	
Worst Performing Feeder Ranking ***(Worst Feeder)***	583

Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	12	7	18
Feeder CMO ***(Cumulative)***	666	82	1,584

Benefits

- Replaces aging direct buried cables that are at risk of failing
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Increases long term reliability of the subdivision with the construction of new concrete encasements that will provide mechanical protection to the insulation of the new cables and prevent puncture damages by dig-ins and deterioration due to backfill pressure and heat.
- Increased access to cable for installation, repairs, and replacement of cabling in the event of outages thereby improving response time, and will reduce safety hazards to utility personnel and the surrounding community.

IMPACT OF DEFERRAL

If this project is deferred, the electrical component of this project cannot be executed without the completion of this civil work - either in the same year or electrical in the immediate next year. Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Rebuild UG Trunk NT63M12 M8 Brimley - Electrical
Project Number:	21869
Project Year:	2013
Estimate Cost:	$ 758,453

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old direct buried 750kcmil (and also 350kcmil) with 1000kcmil Al cable in CE duct along Brimley Rd from Steeles Ave to Finch Ave. This project will establish a true feeder tie between NT63M12 and M8 with the upgrading of standard size of cable on feeder mains. This part of the project deals with electrical work only.

Scope:

The scope of work for this project is to install new cables in CE ducts built by the civil part of the project running along Brimley Rd. The scope includes installation of four SF6 pad switches and four OH SCADAmate switches.

DISTRICT	Scarborough
DISTRICT NEIGHBOURHOOD	Brimley Road
STATION(S)	Agincourt TS(27.6 kV)
FEEDER(S)	SCNT63M12, SCNT63M8

JUSTIFICATION

Project Background

There is a stretch of undersized cable, built direct buried, connecting feeders NT63M12 and M8 running along Brimley Rd from Steeles Ave to McNicoll Ave and then from MCNicoll Ave to Finch Ave.

To bring the capacity of the feeder mains and to improve the reliability of the feeders and the system to the THESL standard, THESL proposes this project and its related civil project.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			2
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	7971	16463	1686
Feeder CMO ***(Cumulative)***	185746	732101	364363

Benefits

- Replaces a section of undersized cable of two feeders built direct buried,
- Establish a true feeder tie between NT63M8 and M12 with the upgrading of standard size of cable on feeder main
- Brings the capacity of the feeder mains to normal and THESL standard
- Installs modern assets (SF6 pad switches and OH SCADAmates) to improve the feeder reliability and operational flexibility.

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project would prolong construction in this area and resulting in customer dissatisfaction, given that civil work had already commenced in 2013. The benefit and return of the investment will not be achieved in time. There will be risk of overloading in contingency situation if the project is deferred. Deferral is likely to result in poor feeder reliability and customer satisfaction.

Portfolio:	Underground
Project Title:	Scunthorpe - Invergordon H9M26 UG Rebuild 1 Phase – Electrical
Project Number:	20529
Project Year:	2013
Estimate Cost:	$ 752,865

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old direct-buried 350kcmil primary cables in the area of Scunthorpe Rd and Invergordon Ave supplied by feeder NAH9M26. The distribution will be reconfigured to apply THESL standard design and construction. This part of the project deals with electrical work only for the single-phase residential loops.

Scope:

For improving the reliability and bringing the distribution to the latest and modern THESL standards, Asset Management will replace the primary cable with a reconfiguration of the distribution and rebuild the subdivisions with cables in concrete-encased duct. The project will address the removal of non-standard single-phase PMHs and the old and obsolete VWS interrupter switch.

The scope of work for this project is to install new cables in concrete encased ducts built by the civil part of the project along Carlingwood Ct, Havenview Rd and Invergordon Ave (part) and Thistlewaite Cr, Massie St, West Burton Ct, Prince William Ct, Plum Brook Cr, Spring Forest Sq, Penny Brook Ln, Scunthorpe (part), Crown Acres Ct, Kimbercroft Ct and the internal roads of the TH complex at 20 Kimbercroft Ct. This project requires the replacement of 7,400m of primary cable, 45 transformers.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SCUNTHORPE & INVERGORDON
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M26

JUSTIFICATION

Project Background

The distribution in the area was built within a time span of 1982 to 1985 with direct-buried cables. The distribution experienced a number of cable, elbow and transformer failures in the recent past years.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			706
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	120	3,980	0
Feeder CMO ***(Cumulative)***	16,920	157,921	0

Benefits

- • Replaces 30 years' old failing direct buried cables for the industrial area.
- • Reconfigures the distribution for the latest THESL standard for operation and protection.
- • removes the non-standard single phase PMHs and the old and obsolete VWS interrupter switch.
- • Targets to achieve better operational flexibility and more reliable supply.

IMPACT OF DEFERRAL

Completion of a other projects connected to the same area of the feeder will be jeopardized if thie project is deferred.If this project was to be deferred, the electrical component of this project would prolong construction in this area and resulting in customer dissatisfaction, given that civil work had already commenced in 2013. The benefit and return of the investment will not be achieved in time. Deferral is likely to result in poor feeder reliability and customer satisfaction.

Portfolio:	Underground
Project Title:	Replace/Upgrade cable from PILC to 500 TRXLPE on A-93-B
Project Number:	13307
Project Year:	2013
Estimate Cost:	$751,761

PROJECT DESCRIPTION

Objective:

To replace all Paper Insulated Lead Covered (PILC) cable on the trunk of feeder A93B to the standard 500kcmil Tree Retardant Cross-link Polyethylene (TRXLPE) cable

Scope:

This project would enable the replacement and upgrade the existing 1928 meters of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	BRIDGEMAN
STATION(S)	BRIDGEMAN TS
FEEDER(S)	A93B

JUSTIFICATION

Project Background

This project was initiated as per the Lead Cable Replacement Program with a vision to ultimately improve safety and environmental conditions within cable chambers, due mainly to lead and Polychlorinated biphenyls (PCB) exposure.

Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

In addition to the environmental benefits of replacing PILC cable, this specific feeder was also chosen for upgrade because many portions of this feeder are smaller 2/0 size of PILC, thereby not allowing for future expansion.

Benefits

- Removal of risk of harmful effects of lead and potential PCB oil exposure
- Increased room for load growth and flexibility for load transferring by upgrading PILC feeder whose trunk sizes are 2/0 or 350kcmil with higher ampacity 500kcmil TRXLPE cable. This specific feeder will have room for new loads to be connected to it after this upgrade.
- Address procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks will continue for Toronto Hydro workers, due mainly to potential exposure to PCB's, and lead. If the lone North American manufacturer stops producing PILC cable, THESL will not only have a sourcing/procurement issue, but will also have a very large volume of PILC cable replacement projects to execute. No additional room for expansion for customers connected to this feeder.

Portfolio:	Underground
Project Title:	Nugget Avenue UG Rebuild Civil SCNAH9M23
Project Number:	21663
Project Year:	2013
Estimate Cost:	$ 749,131

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild a portion of feeder SCNAH9M23 containing aged direct buried XLPE cable which has passed its useful life span to prevent future negative impact to customers due to equipment failure. This project is one phase of a multi-phase program to remove the direct-burried primary cable on SCNAH9M23.

Scope:

The scope of work for this project is to design and construct the civil infrastructure (concrete encased ducts) for the replacement of direct buried cables in the following areas: Shorting Road, Nugget Avenue and Dovedale Court. This will replace the existing direct buried cables and bring distribution in this industrial area to the latest THESL standards. This involves the installation of 1.5km of civil duct.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	NUGGET
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M23

JUSTIFICATION

Project Background

The direct buried XLPE cable in this industrial/commercial neighbourhood was installed in 1978 and has surpassed its estimated maximum useful lifespan of 25 years. The neighbourhood will be rebuilt with new 1/0 aluminum cables in concrete encased duct with Supervisory Control and Data Acquisition (SCADA) switches for improved reliability.

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in corrosion and damage to the outer neutral conductors as well as contributing to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables did not have sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant cross-linked polyethylene (“XLPE”). These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE

Worst Performing Feeder Ranking ***(Worst Feeder)***			204
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	397	1,963	1,163
Feeder CMO ***(Cumulative)***	45,432	25,952	8,086

Benefits

- Replaces aging direct buried cables that are at risk of failing
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with smaller loops with standard fusing
- Increases long term reliability of the subdivision with the construction of new concrete encasements that will provide mechanical protection to the insulation of the new cables and prevent puncture damages by dig-ins and deterioration due to backfill pressure and heat.
- Increased access to cable for installation, repairs, and replacement of cabling in the event of outages thereby improving response time, and will reduce safety hazards to utility personnel and the surrounding community.

IMPACT OF DEFERRAL

If this project is deferred, the electrical component of this project cannot be executed without the completion of this civil work - either in the same year or electrical in the immediate next year. Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A13K from PILC to 500kcmil TRXLPE cable
Project Number:	18743
Project Year:	2013
Estimate Cost:	$ 742,421

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered (PILC) cable on the trunk of feeder A13K with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene (TRXLPE) cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 620m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	GERRARD
STATION(S)	GERRARD TS
FEEDER(S)	A13K

JUSTIFICATION

Project Background

This project was initiated as per the Lead Cable Replacement Program with a vision to ultimately improve safety and environmental conditions within cable chambers, due mainly to lead and Polychlorinated biphenyl (PCB) exposure.

Potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

This specific feeder was also chosen for upgrade because it contains belted-type PILC cable, which is the oldest PILC cable type in THESL's distribution system.

Benefits

- Removal of risk of harmful effects of lead and potential PCB oil exposure
- Increase capacity for projected load growth and flexibility for load transferring by upgrading PILC feeder whose trunk sizes are 2/0 and 350kcmil with higher ampacity 500kcmil TRXLPE feeders
- Address procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks will continue for Toronto Hydro workers due mainly to potential exposure to PCB’s and lead. If the lone North American manufacturer stops producing PILC cable, THESL will not only have a sourcing/procurement issue, but will also have a very large volume of PILC cable replacement projects to execute.

Portfolio:	Underground
Project Title:	Durnford/Rylander/Tideswell 47M17 3-Ph Loop-Civil
Project Number:	20200
Project Year:	2013
Estimate Cost:	$ 737,804

PROJECT DESCRIPTION

Objective:

The purpose of this project is primarily to provide civil infrastructure in advance of the related electrical project that intends to proactively reduce the probability of a system failure by replacing the aged direct buried cross-linked polyethelene ("XLPE") cables on feeder SCNA47M17 within the area along the streets of Vandorf Street, Sheppard Avenue, Rylander Boulevard, Tideswell Boulevard and Durnford Road.

Scope:

The scope of work for this project is to install new concrete-encased conduit to enclose the tree-retardant cross-linked polythelene ("XLPE") cables on feeder SCNA47M17 along the streets of Vandorf Street, Sheppard Avenue, Rylander Boulevard, Tideswell Boulevard and Durnford Road. In total, 1.4 kilometers of this civil infrastructure will be installed. In addition, an existing air-insulated pad-mounted switch will be replaced with a standard SF6-insulated pad-mounted switch.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	DURNFORD ROAD
STATION(S)	SHEPPARD TS
FEEDER(S)	SCNA47M17

JUSTIFICATION

Project Background

Early vintage direct buried XLPE cables have been identified as being poor performing assets, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in corrosion and damage to the outer neutral conductors as well as contributing to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables did not have sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. The assets within this particular area were installed in 1985 and have exceeded their useful life criteria. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant cross-linked polyethylene (“XLPE”). These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			63
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	9,360	7,260	7,740
Feeder CMO ***(Cumulative)***	603,103	114,973	198,324

Benefits

- Upgrades equipment on one of the worst performing feeders (63th) in the THESL system that has a high FESI rank (9)
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Improved feeder reliability, due to replacement of direct buried infrastructure
- Reduced outage duration time due to capability of pulling cables through conduit during outage
- Improved renewal of asset infrastructure during outage, as assets can be replaced entirely (as opposed to direct buried cables, which can only be repaired via a splice)
- Improved mechanical protection against dig-ins and external events
- Improved operational flexibility and reliable supply

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration.

Portfolio:	Underground
Project Title:	UG Rebuild Macey Denton R43M27-M23 Tie-Civil
Project Number:	22822
Project Year:	2013
Estimate Cost:	$ 731,149

PROJECT DESCRIPTION

Objective:

The objective of this project is to establish a feeder tie and also replace the old and deteriorated primary cables installed direct buried in seventies in the area of Denton and Macey Ave. Feeder NAR43M27 supplies the area and NAR43M23 is the standby for the area. This part of the project deals with civil work only.

Scope:

The scope of work is to design and install civil infrastructure for the rebuild of the three phase distribution of the area covered by NAR43M23 in an area bounded by Denton Av, Macey Av, St. Dunstan Dr and Albion Av. The project requires installation of 1,230m of concrete encased duct and 14 poles.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MACEY & DENTON
STATION(S)	WARDEN TS
FEEDER(S)	SCNAR43M23, SCNAR43M27

JUSTIFICATION

Project Background

The three phase distribution in the area of Denton and Macey Avenue was built in seventies with direct buried cables. The distribution is very old (35 years')and though there was no failure in the last 3 years, the old direct buried cables are likely to fail any time. The assets in the building vaults deteriorated and may cause flashover anytime. Feeder NAR43M27 supplies the area and NAR43M23 is the standby for the lateral. For improving the reliability and bringing the distribution to the latest and modern THESL standard, THESL will rebuild the three phase distribution with cables in concrete encased duct , rebuild the vaults with new switches and also establish a feeder tie between R43M23 and R43M27.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			127
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,797	715	5,310
Feeder CMO ***(Cumulative)***	535,773	169,367	143,186

Benefits

- Establishes a feeder tie at the station
- Replaces the old and deteriorated direct buried primary cables that are at risk of failing.
- Replaces existing PMH switch (prone to failure) with SF6 padmount switch.
- Replaces and modernizes by installing SF6 SWITCHGEAR and mini-rupters on the HV side of the transformers at the customer vaults.

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs.

Portfolio:	Underground
Project Title:	Rebuild Trunk 502M1 M22 Birchmount-Civil
Project Number:	21585
Project Year:	2013
Estimate Cost:	$ 726,737

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old direct buried 750kcmil with 1000kcmil Al cable in CE duct along Birchmount Rd from Steeles Ave to Hydro One R.O.W South of McNicoll Ave. This project will upgrade the feeder trunk of two feeders NA502M21 and M22.

This part of the project deals with civil work only.

Scope:

The scope of work is to design and install civil infrastructure for the replacement of the old direct buried 750kcmil cables along Birchmout Rd from Steeles Ave to Hydro One ROW. This project would then require the installation of 1,800m of concrete encased duct.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	BIRCHMOUNT
STATION(S)	CAVANAUGH TS
FEEDER(S)	SCNA502M21, SCNA502M22

JUSTIFICATION

Project Background

There is a stretch of undersized cable, most part of which was built direct buried, connecting feeders NA502M21 and M22 running along Birchmout Rd from Steeles Ave to Hydro One ROW. To bring the capacity of the feeder mains and to improve the reliability of the feeders and the system to the THESL standard, THESL proposes this project and its related electrical project.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			18
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			11
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	16,772	26,332	12,771
Feeder CMO ***(Cumulative)***	1,055,089	775,181	343,121

Benefits

- Replaces a section of undersized cable of two worse feeders (NA502M21 and M22) built direct buried,
- Brings the capacity of the feeder mains to normal and THESL standard

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs.

Portfolio:	Underground
Project Title:	Rebuild UG Trunk 502M21-28 Warden -Electrical
Project Number:	21934
Project Year:	2013
Estimate Cost:	$ 722,191

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old direct buried 750kcmil XLPE with 1000kcmil Al TRXLPE cable in CE duct along Wrden Ave from Steeles Ave to Hydro One ROW. This project will establish a true feeder tie between NA502M21 and 502M28 with the upgrading of standard size of cable on feeder mains. This part of the project deals with electrical work only.

Scope:

The scope of work for this project is replace 9,000m of existing direct buried cable with new 1000kcmil cables in concrete encased ducts running along Warden Ave from Steeles Ave to Hydro One ROW.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	WARDEN
STATION(S)	CAVANAUGH TS
FEEDER(S)	SCNA502M21, SCNA502M28

JUSTIFICATION

Project Background

There is a stretch of undersized cable, built direct buried, connecting feeders NA502M21 and 502M28 running along Warden Ave from Steeles Ave to McNicoll Ave and then from MCNicoll Ave to Hydro One ROW. To bring the capacity of the feeder mains and to improve the reliability of the feeders and the system to the THESL standard, Asset Management proposes this project and its related civil project.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			121
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	13,567	13.617	8,639
Feeder CMO ***(Cumulative)***	827,586	356,182	401,534

Benefits

- Replaces a section of undersized cable of two feeders (502M21 and M28) built direct buried,
- Establish a true feeder tie between NA502M21 and M28 with the upgrading of standard size of cable on feeder main
- Brings the capacity of the feeder mains to normal and THESL standard,
- Installs modern assets (SF6 pad switches and OH SCADAmates) to improve the feeder reliability and operational flexibility.

IMPACT OF DEFERRAL

Delays in this work could lead to a higher risk of equipment failure and outages to customers. Deferral may bring this project in conflict with projects from other utilities or newly imposed city moratorium as THESL has communicated this project to the city and other utilities. There will be risk of overloading in contingency situation if the project is deferred. Deferral is likely to result in poor feeder reliability and customer satisfaction.

Portfolio:	Underground
Project Title:	NY51M24 UG Rebuild in Subdivision by Don Mills & Sheppard Part 1 - Electrical NY51M24
Project Number:	21401
Project Year:	2013
Estimate Cost:	$ 716,501

PROJECT DESCRIPTION

Objective:

The object of this project is to proactively reduce the probability of a system failure by replacing the aged direct buried cabling of feeder NY51M24 in the subdivision located southwest of the Don Mills Road and Sheppard Avenue intersection.

Scope:

In the subdivision bounded by Sheppard Avenue to the north, Shaughnessy Boulevard to the East, Havenbrook Boulevard to the South and Leslie Street to the West, replace all direct buried cables on feeder 51M24 with 1/0 28kV Insulated STR AL TRXLPE 1-phase cables enclosed in concrete encased ducts. In addition, submersible transformers and accessories in the area will also be replaced with equipments as per current standard.

DISTRICT	North York
DISTRICT NEIGHBOURHOOD	Don Mills Road & Sheppard Avenue East
STATION(S)	Leslie II TS
FEEDER(S)	NY51M24

JUSTIFICATION

Project Background

This feeder has had seven outages in the last 12 months with cable failure as the primary cause. Cable faults are being addressed in this project by replacing aged, direct buried cabling including #1 solid types found at various segments of the feeder.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			65
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5141	4337	6265
Feeder CMO ***(Cumulative)***	129367	211103	324587

Benefits

- This scope rejuvenates the local distribution system by replacing hardwares on the aging distribution system in the section of the subdivision west of Shaughnessy Boulevard.
- Improves utility field-staff safety as it eliminates electrical hazards by rehabilitating and modernizing transformer vaults along the feeder route in the reference area.
- Improves response times as it upgrades riser switches from manual operation to automatic operation.
- Improves feeder reliability by replacing failed cables which had accounted for up to 83% of the feeder's outages in the last four years.
- Old open type switches are being replaced with sealed SF6 units will reduce equipment footprints in the vaults and on outdoor pads.
- This project improves reliability as it eliminates solid core cabling along the feeder.

IMPACT OF DEFERRAL

Deferral of this project will increase the likelihood of outages and as over 83% of outages on this feeder in the last 12 months and in the last 4years had been on underground cabling that is being focussed on in this project. While this project is being deferred, an outage will affect about 600 residential customers. Being a mostly underground project, deferral will increase the risk of encountering renewed moratorium constraints imposed by the city authorities.

Portfolio:	Underground
Project Title:	Feeder Automation Project on SCNA502M28
Project Number:	23156
Project Year:	2013
Estimate Cost:	$ 694,674

PROJECT DESCRIPTION

Objective:

Feeder Automation on the Cavanaugh Feeder SCNA502M28

Scope:

The scope of this project involves installation and upgrade of 6 SCADA controlled switches on feeder SCNT502M28 to enable automation for timely power restoration in the event of failure.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	VICTORIA PARK & IANGROVE
STATION(S)	CAVANAGH TS
FEEDER(S)	SCNA502M28

JUSTIFICATION

Project Background

Toronto Hydro has successfully implemented a 10 feeder automation scheme in 2010 with satisfactory performance. The same technology is planned to be implemented across the 27.6kV looped distribution system for reliability improvement.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			121
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	500	6,518	3,825
Feeder CMO ***(Cumulative)***	58,500	299,716	309,496

Benefits

- The project installs automated switches which will allow automatic recovery of power to customers in the event of an outage with minimal response time thereby reducing Customer Minute Outage (CMO) counts.

IMPACT OF DEFERRAL

Deferral will complicate the scheduling of related feeder automation projects on adjacent feeders jeopardizing the functionality of the overall feeder automation scheme This will also negate the positive work Toronto Hydro has done in the past years in the area of smart grid and feeder automation to deliver quality service and reliability to Toronto Hydro customers.

Portfolio:	Underground
Project Title:	UG Rebuild PJF3 Wondown & Milah Securities SD -Civil
Project Number:	22220
Project Year:	2013
Estimate Cost:	$ 685,543

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old and deteriorated 13.8kV primary cables, installed direct buried between 1974 to 1978, in the area of Goldberry Sq, Boxhill Dr, Feagan Dr and south end of Bathgate Dr (Wondown and Milah Securities Subdivisions). The area is supplied by feeder PJF3.This part of the project deals with civil work only.

Scope:

The scope of work is to design and install civil infrastructure for the rebuild of area covered by PJF3: Goldberry Sq, Boxhill Dr, Feagan Dr and south end of Bathgate Dr. The work for this project wil then require the installation of 1,800m of concrete encased duct.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	GOLDBERRY
STATION(S)	CENTENIAL D'ARCY MAGEE
FEEDER(S)	SCPJF3

JUSTIFICATION

Project Background

The distribution in the area of Goldberry Sq, Boxhill Dr, Feagan Dr and south end of Bathgate Dr. (Wondown and Milah Securities Subdivisions) was built in the time span of 1974 to 1978 with direct buried cables. The distribution experienced a few failures of cable, elbow and transformers in the past years. For improving the reliability and bringing the distribution to the latest and modern THESL standard, THESL will rebuild the subdivisions with cables in concrete encased duct. Considering future conversion the primary cable will be selected for 27.6kV rating.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			277
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	0	423	2,554
Feeder CMO ***(Cumulative)***	0	27,918	35,189

Benefits

- Replaces 40 years' old failing direct buried cables that are at risk of failing
- Upgrades equipment on one of the oldest 13.8kV feeder.
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs.

Portfolio:	Underground
Project Title:	UG Lateral Cable Replacement
Project Number:	13285
Project Year:	2013
Estimate Cost:	$ 680,693

PROJECT DESCRIPTION

Objective:

To replace direct buried lateral XLPE cable supplied from 55M10 along Finch between Jane and Romfield to improve reliability.

Scope:

This project involves the replacement of existing direct buried cable with new cable installed in concrete encased duct. This project requires replacement of 8 transformers, 2,600m of primary cable and 180m of concrete encased ducts.

DISTRICT	NORTHYORK
DISTRICT NEIGHBOURHOOD	JANE AND FINCH
STATION(S)	FINCH I TS
FEEDER(S)	NY55M10

JUSTIFICATION

Project Background

Early vintage XLPE cable has been identified as a poor performing cable. As such, THESL is proactively replacing this type of cable. Furthermore, for the most part, this cable replaced within this scope is #1 solid. It is a very poor performing asset. This will lead to improvement in system reliability by reducing feeder outage duration time and frequency.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			250
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1	3,136	5,394
Feeder CMO ***(Cumulative)***	667	65,809	147,617

Benefits

- Modernization of the distribution plant as a result of replacement of poor performing cable
- The project reduces the probability of more failures on the feeder with the replacement of non-tree-retardant XLPE cable with new TRXLPE cables as per THESL standard
- Reduction of customer Minutes Out lost due to improved restoration time achieved through the replacement of vault transformers with switchable units
- Improved safety on the feeders as the vaults along the feeder routes will be refurbished and upgraded to the latest THESL standard

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical tree tracking will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers

Portfolio:	Underground
Project Title:	UG Lateral Cable & Transformer Rehab Finch TS
Project Number:	13273
Project Year:	2013
Estimate Cost:	$680,217

PROJECT DESCRIPTION

Objective:

The purpose of this project is intended to improve reliability by reducing the probability of outages due to underground lateral cable and equipment failures on NY55M26 along Oakdale Rd., between Finch Ave. and Jody Ave.

All XLPE primary service lateral cables with 1/0 Al, 28kV, some of which are #1 Solid type, are to be replaced with TRXLPE cable from OH riser poles to transformer vaults/room/pads.

Scope:

This project involves the replacement of existing direct buried cable with new cable installed in concrete encased duct. This project requires replacement of 8 transformers, 2,475m of primary cable, 3 transformers and 440m of concrete encased ducts.

DISTRICT	NORTHYORK
DISTRICT NEIGHBOURHOOD	OAKDALE & JODY
STATION(S)	FINCH II
FEEDER(S)	NY55M26

JUSTIFICATION

Project Background

NY55M26 is currently identified as a FESI-12 feeder, with a worst performing feeder rank of 127. The feeder's condition has been deteriorating according to reliability data. A vast majority of the faults were specifically caused by non-standard CSP transformers and glass insulators within the last year.

Early vintage XLPE has been identified as a poor performing cable. As such, THESL is proactively replacing this type of cable. In this way, there will be improvement to system reliability, as well as reduce feeder outage duration time and frequency, and reduce system losses. The existing laterals on this feeder utilize non-standard XLPE cable, some of which are #1 Solid types, and will be upgraded to TRXLPE cable. Further improving the FESI status of NY55M26 requires reducing the probability of failure in the underground lateral cable and its associated equipment.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			128
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			13
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	150	693	1,334
Feeder CMO ***(Cumulative)***	18,085	45,076	61,657

Benefits

- Increases reliability through the replacement of early vintage XLPE and optimally reconfiguring the system. Customer satisfaction is improved as a result of greater service reliability.
- Provides greater flexibility for power distribution and mechanical protection and durability of the underground cabling

- Reduction in emergency and reactive capital and maintenance costs
- Upgrades equipment to current THESL standards

IMPACT OF DEFERRAL

Deferral this worst performing feeder projects will generally lead to sustained or deteriorating reliability problems on the feeder in question, leading to customer dissatisfaction and high reactive investment costs. Furthermore, XLPE cable, especially #1 Solid Type, is more prone to failure than TRXLPE and this feeder has already had 13 outages to date, in the past one year

Portfolio: Underground

Project Title: Constellation Crt - UG Rebuild & Voltage Conversion

Project Number: 13134

Project Year: 2013

Estimate Cost: $662,247

PROJECT DESCRIPTION

Objective:

The purpose of this project is to convert the existing 7 customers surrounding Constellation Crt. from 13.8kV to 27.6kV.

Scope:

The scope of work for this project is to install 7 underground transformers in order to feed the customers on Constellation Crt. This project also includes cabling work to upgrade from 13.8kV to 27.6k.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	CONSTELLATION CRT
STATION(S)	RICHVIEW TS
FEEDER(S)	ET88M41

JUSTIFICATION

Project Background

Constellation MS (13.8 kV) EH-F1 experienced five outages in 2010. Analysis shows that up to four of the outages were related to the condition of the underground loop servicing the light industrial customers on Constellation Crt.

Field personnel have noted that CO-PT64769 is poorly maintained by the customer and there is evidence of arcing in the transformer. In the short-term THESL will attempt to have the customer improve the transformer and pad conditions. For this reason, THESL is proposing a new reconfiguration of the loop and that it gets rebuilt and converted to 27.6 kV. This area will be fed from 88M41 on Carlingview Dr.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			454
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	175	4944	505
Feeder CMO ***(Cumulative)***	880	224869	1562

Benefits

- Higher primary voltage will have lower line losses and higher transmission efficiency.
- Increases reliability through the replacement of early vintage XLPE and optimally reconfiguring the system.
- Lowers the probability of failures due to the defective customer transformers
- Replace aging 4.16kV infrastructure
- Higher voltage will provide more reliability due to new equipment installation
- Increase customer satisfaction

IMPACT OF DEFERRAL

Due to the fact that underground equipment is mostly installed outdoors and operated in harsh environment, it endures elements of nature such as dirt, road salt, and seasonal variation in temperature, water, moisture and condensation. Overtime, its physical integrity degrades causing deterioration in the overall asset health condition.

Delay or postponement of this planned capital program would lead to unplanned power outages from failure of aged or unreliable equipment, causing increased duration and frequency of power outages to customers.

Portfolio:	Underground
Project Title:	Nashdene Tiffield SCNAR26M22 UG Rebuild - Electrical
Project Number:	20336
Project Year:	2013
Estimate Cost:	$ 660,383

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the underground distribution system in this industrial neighbourhood. This is the electrical portion of the project, installing cable in concrete encased duct to enable replacement of aging direct buried XLPE cable and improve the infrastructure of this industrial neighbourhood.

Scope:

The scope of work for this project is the replacement of aging direct buried 3-350 Al 28kV XLPE cable with new 3-1/0 Al 28kV TRXLPE and 3-1000 Al 28kV TRXLPE cable in newly installed civil infrastructure in an area bounded by Nashdene Road, Tiffield Road and Dynamic Drive. This will replace 9,100m of existing direct buried cables with cables in concrete encased ducts and distribution, 2 overhead switches and 3 pad mounted switches.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	NASHDENE & TIFFIELD
STATION(S)	MALVERN TS
FEEDER(S)	SCNAR26M22

JUSTIFICATION

Project Background

This project will rebuild a portion of Feeder NAR26M22 out of Malvern TS to prevent future negative impact to customers. The direct buried cable in this neighbourhood is 32 years old and is past its estimated operation lifespan based on lifecycle information for this type of cable. This feeder was part of a distribution transfer from feeder NAR26M34 and is a new feeder, thus historical feeder performance data is unavailable.

Benefits

- Replaces old direct buried cables (32 years) to prevent future negative impact to customers due to direct buried XLPE cable which has exceeded its useful lifespan and is at risk of failure.
- Reconfigures the distribution for the latest THESL standard for operation and protection. TRXLPE cable in concrete encased duct and smaller loops with standard fuse.

IMPACT OF DEFERRAL

If this project is deferred, the delays in this work could lead to a higher risk of equipment failure and outages to customers, increasing customer dissatisfaction. Deferral may bring this project in conflict with projects from other utilities or newly imposed city moratorium as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Finchdene Industrial SCNAR26M31 UG Rebuild Phase 2 (Electrical)
Project Number:	18639
Project Year:	2013
Estimate Cost:	$ 634,292

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild the old and failing primary distributions of Melford, Pullman CT, NHD Industrial Subdivisions, supplied by feeder NAR26M31. This part of the project is to install the cables connecting the switching cubicles and the customer vaults.

Scope:

The scope of work is to install 1/0 Al cables in concrete encased ducts in an area bounded by Tapscott road, Newgale Gate, Pullman Ct, Torham Pl and Finchdene. Work requires installation of 6 pad mounted switches and 18,000m of primary cable

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	FINCHDENE
STATION(S)	MALVERN TS
FEEDER(S)	SCNAR26M31

JUSTIFICATION

Project Background

This three phase distribution for Finchdene Sq., Pullman Ct., Newgale Gt., Torham Pl. (Melford, Pullman CT, NHD Industrial Subdivisions) was built in 1976 with direct-buried cables. The distribution system, mainly cables, experienced quite a large number of failures over the last recent few years. To improve the reliability of supply to the area distribution and to the customers there, Asset Management will replace the primary cables installed in concrete encased ducts with the latest THESL standard.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			396
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	0	0	730
Feeder CMO ***(Cumulative)***	0	0	3,652

Benefits

- Replaces 35 years' old and failing direct buried cables.
- Upgrades equipment on one of the worst performing feeders (3rd) in the THESL system
- Addresses industrial/commercial distribution that has experienced high fault currents during failure
- Reconfigures the distribution for the latest THESL standard for operation and protection. [smaller loops with 1/0 cable with standard fuse.]

IMPACT OF DEFERRAL

Completion of a other projects connected to the same area of the feeder will be jeopardized if thie project is deferred. If this project was to be deferred, the electrical component of this project would prolong construction in this area and resulting in customer dissatisfaction, given that civil work had already commenced in 2013. The benefit and return of the investment will not be achieved in time.

Portfolio:	Underground
Project Title:	UG Rebuild 63M6 Mid Finch Silver Star Bv-Electrical
Project Number:	22570
Project Year:	2013
Estimate Cost:	$ 624,275

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old and deteriorated primary cables in the area of Silver Star and Kilcullen Castle Gates. The distribution feeds a number of small industries and commercial units. The distribution is presently supplied by feeder NT63M6.

This part of the project deals with electrical work only.

Scope:

The scope of work is to install 10,000m of 1/0 Al cables in CE ducts placed by the civil part of the project on Silver Star Blvd and Kilcullen Castle Gate . The work involves installation of 1 SF6 pad switch and refurbishing of 11 transformer vaults.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SILVER STAR
STATION(S)	AGINCOURT TS
FEEDER(S)	SCNT63M6

JUSTIFICATION

Project Background

The three phase distribution in the area of Silver Star and Kilcullen Castle Gatewas built in 1981 with direct buried cables. The distribution experienced a number of cable failures in the recent past years. For improving the reliability and bringing the distribution to the latest and modern THESL standard, Asset Management will rebuild the subdivisions (Mid- Finch) with cables in concrete encased duct.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			29
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	11,613	6,990	2,325
Feeder CMO ***(Cumulative)***	170,056	33,013	188,397

Benefits

- Replaces 32 years' old failing direct buried cables that are at risk of failing.
- Upgrades equipment on one of the worst performing feeders (29th) in the THESL system
- Addresses industrial/commercial distribution that has experienced high fault currents during failure
- Reconfigures the distribution for the latest THESL standard for operation and protection. [smaller loops with 1/0 cable with standard fuse.]

IMPACT OF DEFERRAL

Deferral of this project will generally lead to sustained or deteriorating reliability problems on the feeder in question, leading to customer dissatisfaction and high reactive investment costs. This is due to the reputation of aging direct buried cable (over 30 years) subject to failing, and the difficulty to repair faults when they occur. If deferred the risk of failure will increase while the restoration time to these customers will remain high causing the reactive crew to invest in non-standard cable past its useful life.

Portfolio:	Underground
Project Title:	UG Rebuild 502M26 Bonis Ave- Civil
Project Number:	22460
Project Year:	2013
Estimate Cost:	$ 619,875

PROJECT DESCRIPTION

Objective:

To purpose of the project is to replace the old and failing direct buried cable along Bonis Ave to improve the reliability of the feeder NA502M26. This part of the project deals with civil works only.

Scope:

The scope of work is to design and install civil infrastructue to rebuild the distribution of the area of Bonis Ave(the three phase /transformers/loads of Bonis Ave.) covered by NA502M26. This project will then require the installation of 1,250m of concrete encased duct.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	BONIS
STATION(S)	CAVANAUGH TS
FEEDER(S)	SCNA502M26

JUSTIFICATION

Project Background

The underground cables along Bonis Ave was installed installed direct buried between year 1989 to 1990. In 2005 there was a flash over on SUG343 (now PS58462) which caused loss of 3000 CI and 35832 CMO. Though the PMH was replaced but none of the connecting cables at that time needed replacement. To avoid future failures and interruptions, THESL is proposing to install concrete-encased ducts and replace the cables in the area.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			674
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	15	0	1
Feeder CMO ***(Cumulative)***	2,955	0	138

Benefits

- Replaces 25 years' old direct buried cables that are at risk of failing.
- Replace existing old PMH with modern SF6 PMHs.
- Addresses industrial/commercial distribution that has experienced high fault currents during failure
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs.

Portfolio:	Underground
Project Title:	Terauley Piece Outs and Leakers
Project Number:	19554
Project Year:	2013
Estimate Cost:	$606,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to piece out un-racked or hanging cable as well as repair any leaking PILC cable within cable chambers in and around the area surrounding Terauley TS. This work will improve system reliability and prevent potential emergency situations arising from unsafe manoeuvre inside cluttered and congested cable chambers.

Scope:

The scope of work for this project is to inspect all related feeders within the identified cable chambers and proceed to repair any deficiencies.

Crews are to begin by inspecting the identified cable chambers in order to determine the number of feeders to be worked on and isolated for scheduling purposes. For cables requiring piece outs, crews are to shorten or add new cable in order to properly rack the cable on the cable chamber walls. For leaking cables, crews can install a lead sleeve replacement to repair the leak or replace the cable.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	TRINTY – SPADINA
STATION(S)	TERAULEY TS
FEEDER(S)	VARIOUS

JUSTIFICATION

Project Background

PILC cable leaks (leakers) and the quantity of un-racked and hanging cables (piece outs) have been an ongoing problem of safety and reliability over the years.

At present, Raychem patches are used as a temporary repair for leaking cables in order to minimize interruption time and a lead sleeve replacement is done at a later date.

There is also growing concern now about the safety of the workers during inspection and work inside the confined space of a cable chamber due to congested and cluttered cable chambers.

The Underground Environmental Health and Safety (UGEH&S) Committee and THESL have taken this issue seriously and in 2008 THESL initiated a multi-year program to clear all the outstanding piece outs and leakers by 2015.

Benefits

- Removes all leaking cable and cable with Raychem patches in the Terauley TS area, thereby improving reliability as leaking cable is prone to failure
- Removes all un-racked and hanging cable within the cable chambers in the Terauley TS area, thereby improving the safety and working conditions for crew

IMPACT OF DEFERRAL

If this project were to be deferred, THESL is at risk of not removing all the piece outs and leakers by 2015 as stated as a part of the multi-year program initiated in 2008. This would prolong the amount of time that leaking cable remains in our system and also prolongs the amount of time unsafe working conditions existing within certain cable chambers.

Portfolio:	Underground
Project Title:	UG Lat Cable and Tx Rehab Cedarcroft, Patricia, etc.
Project Number:	12451
Project Year:	2013
Estimate Cost:	$ 605,465

PROJECT DESCRIPTION

Objective:

To replace XLPE cable with 1/0 Al, 28kV, TRXLPE cable between riser poles and transformer vaults / pads at 12 locations on Cedarcroft, Patricia, Pleasant, Rockford & Bathurst to improve reliability and to replace poor condition transformers in order to improve reliability of a high FESI feeder.

Scope:

All XLPE primary service riser cables are to be replaced with 3-1/0 Al, 28kV, TRXLPE cable.

The locations that have been identified as requiring cable replacement are the laterals that dip at Bathurst, Rockford, Cedarcroft, Patricia and Pleasant. Work requires replacement of 2,400m of primary cable, installation of 135m of concrete encased duct, 6 transformers and refurbishing of 10 transformer vaults.

DISTRICT	NORTHYORK
DISTRICT NEIGHBOURHOOD	PATRICIA-CEDARCROFT
STATION(S)	FAIRCHILD I TS

FEEDER(S)	NY80M2

JUSTIFICATION

Project Background

This feeder is worst performing feeder. Field patrol has identified assets that require replacement to prevent unplanned power outages due to failure.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			69
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4228	2050	7978
Feeder CMO ***(Cumulative)***	113919	23671	327430

Benefits

- Modernization of the distribution plant as a result of replacement of poor performing cable
- The project reduces the probability of more failures on the feeder with the replacement of non-tree-retardant XLPE cable with new TRXLPE cables
- Reduction of customer Minutes Out lost due to improved restoration time achieved through the replacement of vault transformers with switchable units
- Improved safety on the feeders as the vaults along the feeder routes will be refurbished and upgraded to the latest THESL standard

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical tree tracking will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers.

Portfolio:	Underground
Project Title:	Rebuild of SCNAE5-1M25 by Brimley Rd and Skagway Avenue Civil
Project Number:	21188
Project Year:	2013
Estimate Cost:	$ 593,600

PROJECT DESCRIPTION

Objective:

The purpose of this project is primarily to provide civil infrastructure in advance of the related electrical project that intends to address a major cable failure reported in December 2010, and aims to proactively reduce the probability of subsequent failures by replacing the aging direct buried cross-linked polyethelene ("XLPE") cables on feeder NAE5-1M25 within Skagway Avenue area.

Scope:

The scope of work for this project is to install new concrete-encased conduit to enclose the tree-retardant cross-linked polythelene ("XLPE") cables on feeder NAE5-1M25 along Skagway Avenue. In total, 1.4 kilometers of this civil infrastructure will be installed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	BRIMLEY & SKAGWAY
STATION(S)	LESLIE I TS
FEEDER(S)	SCNAE51M25

JUSTIFICATION

Project Background

Early vintage direct buried XLPE cables have been identified as being poor performing assets, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in corrosion and damage to the outer neutral conductors as well as contributing to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables did not have sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation. In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. The assets within this particular area were installed between 1987 and 1988, and will have exceeded their useful life criteria by 2013. Feeder NAE5-1M25 has had several outages over the past few years. As direct buried cables can only be repaired through the installation of a splice, and not completely replaced, any recently impacted sections of these cables have been either repaired or isolated.

The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant cross-linked polyethylene (“XLPE”). These new conduits will provide mechanical protection to the cables against external dig-ins and other factors. These conduits will also allow for the full replacement of cables should they fail in the future, as the cables can be entirely pulled out between devices.

Historical Performance

FEEDER PERFORMANCE

Worst Performing Feeder Ranking ***(Worst Feeder)***			339
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	90	10	86
Feeder CMO ***(Cumulative)***	4,016	198	12,970

Benefits

- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Improved feeder reliability, due to replacement of direct buried infrastructure
- Reduced outage duration time due to capability of pulling cables through conduit during outage
- Improved renewal of asset infrastructure during outage, as assets can be replaced entirely (as opposed to direct buried cables, which can only be repaired via a splice)
- Improved mechanical protection against dig-ins and external events
- Improved operational flexibility and reliable supply

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to the connected 5MVA of load, and 70 industrial customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration.

Portfolio:	Underground
Project Title:	Strachan TS Feeder Transfer from A7-8T to new A11-12T Switchgear
Project Number:	20713
Project Year:	2013
Estimate Cost:	$589,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to transfer all the feeders from the existing A7-8T switchgear located in the north east area of Strachan A building to the proposed new A11-12T switchgear in the south side of Strachan A building. Also to upgrade feeders to increase loading capability for future load growth and connecting new customers to these feeders.

Scope:

The scope of work for this project is to transfer all feeders and station service from existing switchgear A7-8T to the new proposed switchgear A11-12T. Approximately 11 feeders and the station service are to be transferred in this project. 500 kcmil cable is to be used for all primary feeder originating from the new switchgear cell to either the station basement or the first cable chamber outside of the station.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	EXHIBITION PLACE
STATION(S)	STRACHAN TS
FEEDER(S)	A32T, A33T, A34T, A46T, A47T, A48T, A54T,

	A56T, A57T, A58T

JUSTIFICATION

Project Background

The existing switchgears at Strachan TS are aging and under capacity and a plan was put in place to replace and upgrade each of the switchgears. Switchgear A1-2T has been upgraded and switchgear A3-4T is to be replaced by early 2012 by new switchgear A9-10T. Once complete, the decommissioned switchgear A3-4T is to be removed and preparations will begin to install the new switchgear A11-12T in its place. Once switchgear A11-12T is energized, the feeders from A7-8T are to be transferred so that A7-8T can be decommissioned.

Benefits

- Enables new A11-12T to begin supplying load, putting into service the switchgear at the station
- Offloads switchgear A7-8T, allowing for the decommissioning of the existing switchgear

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would have invested millions of dollars and constructed a new switchgear which would be not put into service immediately. In addition, this would delay the decommissioning and upgrade of the final switchgear A5-6T at Strachan TS, thereby increasing the risk of a significant station outage due to the threat of failed equipment.

Portfolio: Underground

Project Title: UG Rebuild 502M26 Bonis Ave- Electrical

Project Number: 22475

Project Year: 2013

Estimate Cost: $ 588,406

PROJECT DESCRIPTION

Objective:

To purpose of the project is to replace the old and failing direct buried cable along Bonis Ave to improve the reliability of the feeder NA502M26. This part of the project deals with electrical works only.

Scope:

The scope of work is to replacement of 7,000m of existing direct buried cable with 1/0 Al cables in CE ducts in Bonis Ave. area, 3 padmounted switch installation, replacement of 1 transformer and refurbishing 6 transformer vaults.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	BONIS AVENUE
STATION(S)	CAVANAUGH TS
FEEDER(S)	SCNA502M26

JUSTIFICATION

Project Background

The underground cable along Bonis Ave was installed direct buried between years 1989 to 1990. In 2005 there was a flash over on SUG343 (now PS58462) which caused loss of

3000 CI and 35832 CMO. Though the PMH was replaced but none of the connecting cables at that time needed replacement.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			674
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	15	0	1
Feeder CMO ***(Cumulative)***	2,955	0	138

Benefits

- Replaces 25 years' old direct buried cables that are at risk of failing.
- Upgrades equipment (replace existing old PMH with modern SF6 PMHs).
- Addresses industrial/commercial distribution that has experienced high fault currents during failure
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical tree tracking will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers.

Portfolio:	Underground
Project Title:	51M22, 51M4 UG rehab off Sheppard & Victoria Park Intersection-Civil
Project Number:	22508
Project Year:	2013
Estimate Cost:	$ 554,108

PROJECT DESCRIPTION

Objective:

This project is to provide the necessary civil structures when direct buried cables are removed from the feeders and replaced with those enclosed concrete encased ducts.

Scope:

Scope of this project involves design and construction of concrete encased ducts to enable replacement of direct buried cable on feeder 51M22 and 51M4 with new cables installed in concrete encased ducts in an area bounded by Victoria Park Avenue, Patrick Blvd, Yorkland Road and Yorkland Blvd. This project will then require the installation of 1,720m of concrete encased duct.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	SHEPPARD & VICTORIA PARK
STATION(S)	LESLIE I TS
FEEDER(S)	NY51M22, NY51M4

JUSTIFICATION

Project Background

The sub-lateral distribution off Victoria Park Avenue into the Patrick Blvd and Hazelnut Crescent is currently not well configured for switching when outages occur and there is need to isolate faulted locations. As a result, the CMO counts have been very high in this area. The distribution area is being reconfigured by this scope package, to improve switching by detaching the cabling that goes along Hazelnut Crescent from the feeder NY51M4 and adding it to the feeder NY51M22. This would mean the two existing loops in the area will be combined into a single large loop supplied by NY51M22 on Brian Drive. Cables along the feeders, selected for replacement are aged, mostly XLPE and are direct buried. Direct buried medium voltage XLPE cables pose a heightened risk of failure due to possibility of damage from dig-ins, and insulation deterioration therefore worsening the reliability of the feeder. The aged cables will be replaced in the related electrical project so concrete encased ducts would be constructed along the routes in preparation for the replacement cables.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			112
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,784	3,617	9,212
Feeder CMO ***(Cumulative)***	146,174	114,504	199,529

Benefits

- Provides civil infrastructure in advance for the underground distribution rebuild of in the area of the Sheppard Avenue and Victoria Park intersection
- New civil infrastructure being built replaces the aged direct buried setup with new

concrete encasements that will provide mechanical protection to the insulation of the new cables preventing puncture damages by dig-ins and deterioration due to backfill pressure and heat.

- New concrete encasements will allow easier access to the installed cabling in the event of outages thereby improving response time, and will reduce safety hazards to utility personnel and the surrounding community.

IMPACT OF DEFERRAL

Deferral of the project will prevent completion of the construction of the concrete duct banks before the new underground cabling is installed and may cause the other project (UG cabling rebuild) to stall exposing the feeder to further outages due to lack of timely replacement of the failing assets. About 7MVA will be lost in an outage on this feeder segment impacting 1500 customers. Deferral of the project exposes it to the risk of encountering conflicts with the work schedules of other utilities in the environment as well as the increased risks of encountering new moratorium constraints imposed by the city administration.

Portfolio:	Underground
Project Title:	UG Lateral Cable & Tx Rehab Bathurst & Rockford
Project Number:	12449
Project Year:	2013
Estimate Cost:	$ 553,855

PROJECT DESCRIPTION

Objective:

To replace XLPE cable with 1/0 Al, 28kV, TRXLPE cable between riser poles and transformer vaults / pads at 9 locations along Bathurst St and Rockford Rd. in order to improve reliability.

To replace poor condition transformers in order to improve reliability of a high FESI feeder

Scope:

This project involves replacement of poor performing assets in an area bounded by Bathurst St, Carpenter, Stonedene and Rockford. Work requires replacement of 3,000m of primary cable, installation of 30m of concrete encased duct and replacement of 6 transformers.

DISTRICT	NORTHYORK
DISTRICT NEIGHBOURHOOD	BATHURST-ROCKFORD
STATION(S)	FAIRCHILD I TS
FEEDER(S)	NY80M2

JUSTIFICATION

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			69
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4,228	2,050	7,978
Feeder CMO ***(Cumulative)***	113,919	23,671	327,430

Benefits

- Modernization of the distribution plant as a result of replacement of poor performing cable
- The project reduces the probability of more failures on the feeder with the replacement of non-tree-retardant XLPE cable with new TRXLPE cables
- Reduction of customer Minutes Out lost due to improved restoration time achieved through the replacement of vault transformers with switchable units
- Improved safety on the feeders as the vaults along the feeder routes will be refurbished and upgraded to the latest THESL standard

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical tree tracking will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers.

Portfolio:	Underground
Project Title:	Rebuild UG Trunk NT63M8 M11 McCowan-Civil
Project Number:	21864
Project Year:	2013
Estimate Cost:	$ 534,025

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old direct buried 350kcmil with 1000kcmil aluminum cable in concrete encased duct along McCowan Road from McNicoll Avenue to Sandhurst Circle. This project will establish a true feeder tie between NT63M8 and M11 with the upgrading of standard size of cable on feeder main. This part of the project deals with civil work only.

Scope:

The scope of work for the project is to design and install civil infrastructure for the replacement of the old direct buried three phase 350kcmil cables along McCowan Road from McNicoll Avenue to Sandhurst Circle.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MCCOWAN
STATION(S)	AGINCOURT TS
FEEDER(S)	SCNT63M8, SCNT63M11

JUSTIFICATION

Project Background

There is a stretch of undersized cable, built direct buried, connecting feeders NT63M8 and M11 running along McCowan Rd from McNicoll Ave to Sandhurst Circle. To bring the capacity of the feeder mains and to improve the reliability of the feeders and the system to the THESL standard, THESL proposes this project and its related electrical project.

Early vintage direct buried XLPE cables have been identified as being a poor performing asset, contributing to system reliability degradation. These cables have been constantly exposed to neutral and sheath corrosion from the surrounding soil, resulting in corrosion and damage to the outer neutral conductors as well as contributing to the degradation of insulation strength.

The manufacturing processes employed in these early vintage XLPE cables did not have sufficiently strict quality controls to (a) keep out the impurities from the insulation system or (b) provide reliable sealing of the insulation system to prevent moisture ingress. The steam curing process employed in the manufacture of early vintage XLPE cables also resulted in moisture being trapped in the insulation system. Due to these manufacturing defects, these cables have suffered from high rates of premature failure of insulation.

In addition, due to the nature of the direct buried installation, these assets are susceptible to damage from external dig-ins and movement of surrounding earth. A series of cable, elbow and transformer failures have occurred over the past few years. The purpose of this project is to install the concrete-encased conduits necessary to house the new tree-retardant cross-linked polyethylene (“XLPE”). These new conduits will provide mechanical protection to the cables against external dig-ins and other factors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			62
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	6,986	11,495	227
Feeder CMO ***(Cumulative)***	211,997	316,597	39,508

Benefits

- Replaces aging direct buried cables that are at risk of failing
- Upgrades equipment on one of the worse performing feeders (62th) in the THESL system.
- Increses operational flexibility by establishing a true feeder tie between NT63M8 and M11
- Increases the capacity of the feeder mains and allows feeder to accommodate future load growth
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Increases long term reliability of the subdivision with the construction of new concrete encasements that will provide mechanical protection to the insulation of the new cables and prevent puncture damages by dig-ins and deterioration due to backfill pressure and heat
- Increased access to cable for installation, repairs, and replacement of cabling in the event of outages thereby improving response time, and will reduce safety hazards to utility personnel and the surrounding community

IMPACT OF DEFERRAL

If this project is deferred, the electrical component of this project cannot be executed without the completion of this civil work - either in the same year or electrical in the immediate next year. Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration. The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs. Moreover, deferral may also cause this project to be in conflict with projects from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Replace/upgrade feeder A59H from PILC to 500kcmil TRXLPE cable
Project Number:	18688
Project Year:	2013
Estimate Cost:	$ 523,381

PROJECT DESCRIPTION

Objective:

To replace Paper Insulated Lead-Covered (PILC) cable on the trunk of feeder A59H with the standard 500kcmil Tree-Retardant Cross-Linked Polyethylene (TRXLPE) cable and rebuild cable chambers as required.

Scope:

This project will enable the replacement and upgrade of approximately 860m of varying size PILC cable to 500 kcmil TRXLPE.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	HIGH LEVEL
STATION(S)	HIGH LEVEL TS
FEEDER(S)	A59H

JUSTIFICATION

Project Background

This project was initiated as per the Lead Cable Replacement Program with a vision to ultimately improve safety and environmental conditions within cable chambers, due mainly to lead and Polychlorinated biphenyl (PCB) exposure.

Potential procurement issues associated with a lone North American manufacturer of

PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

A59H is also projected to be overloaded within the next ten years under 1st contingency conditions. Upgrading the existing PILC feeder trunk to 500kcmil TRXLPE will provide additional capacity on this feeder.

Benefits

- Removal of risk of harmful effects of lead and potential PCB oil exposure
- Increase capacity for projected load growth and flexibility for load transferring by upgrading PILC feeder whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE feeders
- Address procurement issue associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

Issues of health and environmental risks will continue for Toronto Hydro workers due mainly to potential exposure to PCB's and lead. Feeder is projected to be overloaded within the next ten years. If the lone North American manufacturer stops producing PILC cable, THESL will not only have a sourcing/procurement issue, but will also have a very large volume of PILC cable replacement projects to execute.

Portfolio:	Underground
Project Title:	NY51M24 UG Rebuild in Subdivision by Don Mills & Sheppard Part 2 - Electrical NY51M24
Project Number:	21410
Project Year:	2013
Estimate Cost:	$ 523,121

PROJECT DESCRIPTION

Objective:

The object of this project is to proactively reduce the probability of a system failure by replacing the aged direct buried cabling of feeder NY51M24 in the subdivision located southwest of the Don Mills Road and Sheppard Avenue intersection.

Scope:

The scope of this project involves replacement of direct buried cable on feeder51M24 with 1/0 28kV Insulated STR AL TRXLPE 1-phase cables enclosed in concrete encased ducts in the subdivision bounded by Sheppard Avenue to the north, Shaughnessy Boulevard to the East, Havenbrook Boulevard to the South and Leslie Street to the West. In addition, submersible transformers and cable accessories in the project area will be replaced with new equipments as per current standard.

DISTRICT	North York
DISTRICT NEIGHBOURHOOD	Don Mills Road & Sheppard Avenue East
STATION(S)	Leslie II TS
FEEDER(S)	NY51M24

JUSTIFICATION

Project Background

This feeder has had seven outages in the last 12 months with primary cable failure as the primary cause. Cable faults are being addressed in this project by replacing aged, direct buried cabling including #1 solid types found at various segments of the feeder. Aged and rather unreliable switchgear are already being replaced by two projects in the area in 2011.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			65
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5141	4337	6265
Feeder CMO ***(Cumulative)***	129367	211103	324587

Benefits

- This scope rejuvenates the local distribution system by replacing hardware on the aging distribution system in the section of the subdivision east of Shaughnessy Boulevard.
- Improves utility field-staff safety as it eliminates electrical hazards by rehabilitating and modernizing transformer vaults along the feeder route in the reference area.
- Improves response times as it upgrades pad-mount switches from manual operation to automatic operation .
- Improves feeder reliability by replacing failed cables which had accounted for up to 83% of the feeder’s outages in the last four years.
- Old open type switches are being replaced with sealed SF6 units will reduce equipment footprints in the vaults and on outdoor pads.
- This project improves reliability as it eliminates solid core cabling along the feeder.

IMPACT OF DEFERRAL

Deferral of this project will increase the likelihood of outages and as over 83% of outages on this feeder in the last 12 months and in the last 4years had been on underground cabling that is being focussed on in this project. While this project is being deferred, an outage will affect about 400 residential customers. Being a mostly underground project, deferral will increase the risk of encountering renewed moratorium constraints imposed by the city authorities.

Portfolio:	Underground
Project Title:	Trunk Cable Replacement - The East Mall
Project Number:	13114
Project Year:	2013
Estimate Cost:	$521,992

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace trunk and lateral cables of feeders ETHL- F2 and ETHL- F4 along The East Mall and to replace the transformers within 6 vault locations that have had poor Health Index scores.

Scope:

For feeder HL-F4, THESL plan to replace 1,160m of XLPE cable and refurbish 7 vaults and 5 cable chambers.For feeder HL-F2, THESL plan to replace 700m of XLPE cable. Cabling work, refurbishment of transformer vaults and cable chambers along the routes will be refurbished as well as the replacement of 21 transformers linked by the feeders. The boundaries for this project are The East Mall, Burnhamthorpe and Formula.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	THE EAST MALL
STATION(S)	BLAKETON
FEEDER(S)	ETHLF2, ETHLF4

JUSTIFICATION

Project Background

Station egress cables are required to be highly reliable due to its high impact in the event of a failure. Furthermore, early vintage XLPE has historically performed poorly. Underground lateral supplies to customers are proposed to be replaced with tree retartdand cable. Vault transformers in this are are required to be replaced due to poor health indeces.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			510
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	0	0	264
Feeder CMO ***(Cumulative)***	0	0	39,989

Benefits

- The project reduces probability of more failures on the feeder with the replacement of non-tree retardant XLPE cable with new TRXLPE cables per THESL standard
- The project modernizes the local distribution system by replacing feeder assets that have approached end-of-life
- Reduction of customer minutes lost due to improved restoration time achieved through the replacement of vault transformers with switchable units
- Improved safety on the feeders as the vaults and cable chambers along the feeder routes will be refurbished and upgraded to the latest THESL standards

IMPACT OF DEFERRAL

Deferral of this project will result in outages due to the existence of end-of-life, poor performing assets. Electrical water-tree tracking will lead to the eventual total insulation breakdown over time on the existing non-tree retardant XLPE cabling increasing the imminence of outages and lead to poor reliability along the routes. This area has started to sustain outages during 2010. It is likely that this trend will continue due to the condition and age of the plant in the area.

Portfolio:	Underground
Project Title:	Scunthorpe - Invergordon H9M26 UG Rebuild 3 Phase - Electrical
Project Number:	20471
Project Year:	2013
Estimate Cost:	$ 509,077

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old direct-buried 350kcmil primary cables in the area of Scunthrope Rd and Invergordon Ave supplied by feeder NAH9M26. The distribution will be reconfigured to apply THESL standard design and construction. This part of the project deals with electrical work only.

Scope:

The scope of work is to install new 3x1000kcmil and 3x1/0 Al cable in the new CE ducts placed by the civil part of the project for the rebuild of the area of Havenview Rd, Invergordon Ave. Work requires replacement of 10,000m of primary cable, 2 overhead switches and 2 transformers.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SCUNTHORPE & INVERGORDON
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M26

JUSTIFICATION

Project Background

The distribution in the area was built within a time span of 1982 to 1985 with direct-buried cables. The distribution experienced a number of cable, elbow and transformer failures in the recent past years. For improving the reliability and bringing the distribution to the latest and modern THESL standard, Asset Management will replace the primary cable with a reconfiguration of the distribution and rebuild the subdivisions with cables in concrete encased duct. The project will address the removal of non-standard single phase PMHs and the old and obsolete VWS interrupter switch.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			706
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	120	3,980	0
Feeder CMO ***(Cumulative)***	16920	157,921	0

Benefits

- Replaces 30 year old direct buried cables for the industrial area.
- Upgrades equipment (installs 2 SCADAmate switches and one SCADA pad switch)
- Reconfigures the distribution for the latest THESL standard for operation and protection. [smaller loops with 1/0 cable with standard fuse].
- removes the non-standard single phase PMHs and the old and obsolete VWS interrupter switch.

IMPACT OF DEFERRAL

Deferral of this project will prevent Toronto Hydro to proactivaly replace obsolete and poor performing equipment that has caused power outages in the area in the past. It will subject this industrial area to high risk of power failure.

Portfolio:	Underground
Project Title:	UG Rebuild 63M6 Mid Finch Silver Star Bv- Civil
Project Number:	22569
Project Year:	2013
Estimate Cost:	$ 503,352

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old and deteriorated primary cables in the area of Silver Star and Kilcullen Castle Gates. The distribution feeds a number of small industries and commercial units. The distribution is presently supplied by feeder NT63M6. This part of the project deals with civil work only.

Scope:

The scope of work is to design and install civil infrastructure for the rebuild of the underground assets in the industrial/commercial area covered by NT64M6: Silver Star Blvd and Kilcullen Castle Gate. This project would then entail the installation of 950m of concrete-encased ducts.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SILVER STAR
STATION(S)	AGINCOURT TS
FEEDER(S)	SCNT63M6

JUSTIFICATION

Project Background

The three phase distribution in the area of Silver Star and Kilcullen Castle Gatewas built in 1981 with direct buried cables. The distribution experienced a number of cable failures in the recent past years. For improving the reliability and bringing the distribution to the latest and modern THESL standard, Asset Management will rebuild the subdivisions (Mid- Finch) with cables in concrete encased duct.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			29
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	11,613	6,990	2,325
Feeder CMO ***(Cumulative)***	170,056	33,013	188,397

Benefits

- Replaces 32 years' old failing direct buried cables that are at risk of failing.
- Upgrades equipment on one of the worst performing feeders (29th) in the THESL system
- Addresses industrial/commercial distribution that has experienced high fault currents during failure
- Reconfigures the distribution for the latest THESL standard for operation and protection.

IMPACT OF DEFERRAL

Deferral of the project will expose the feeder to increased counts of outages due to poor performing equipment. Electrical treeing will lead to the eventual insulation breakdown over time on the existing non-tree retardant XLPE cable. This will result in further outages to this feeder and to its customers. Also, the installation of the cables in direct-buried configurations accelerates deterioration.

The deferral of this project may result in future customer interruptions due to the potential failure of assets within this area. The direct buried cables in this area will continue to degrade, resulting in potential insulation failure. This will lead to customer dissatisfaction and high reactive costs.

PROJECTS $500K AND OVER FOR 2013

SUSTAINING PORTFOLIO – OVERHEAD SYSTEM

Table 1: Overhead Projects

Estimate Number	Title	Estimated Cost ($ Millions)
21484	Markland Woods Rear Lot Voltage Conversion Phase #1 (Civil)	4.7
22033	Rear Lot Rebuild UG R43M23 Clonmore Briar Dale (Civil)	3.8
19977	Convert 4kV Merton Feeder B5MR to 13.8kV System	3.1
19966	Convert Dupont MS 4kV B4DU to 13.8kV	3.0
21185	Thorncrest (#011) Rear Lot Voltage Conversion Phase #5 (Civil)	2.8
20662	Rear Lot #011 Civil Infrastructure Phase #1	2.7
22022	Carlaw 4kV Conversion B1E & B13E (Part of Tie B11E)	2.8
19736	Convert Wiltshire 4kV B6W to 27.6kV	2.5
19984	Convert 4kV Dupont B6DU to 13.8kV	2.4
19976	Convert Dupont B71DU to 13.8kV & Remove B51DU	2.2
18738	Millwood MS: B2MD, Merton MS:B1MR, Partial Voltage Conversion TOB2MD, TOB1MR	2.2
20565	CSP and Conductor Replacement 35M24	2.0
19748	Convert Wiltshire B1W to 13.8kV	2.0
21859	35M11 - Bathurst and Lawrence Rebuild	1.9
20919	B3HW and B5HW Conversion and Transfer to A200E	1.9
20714	Thorncrest (#011) Rear Lot Civil Infrastructure Phase #2	1.8
20721	Pole Replacement and Voltage Conversion Along Renforth	1.8
20369	Convert Junction 4kV B11J to 13.8kV	1.7
21639	Refurbish Overhead Feeder - Epsom Downs	1.6
22151	Carlaw 4kV Conversion B5E	1.6
19462	Convert 4kV Wiltshire MS B3W to 13.8kV System	1.5
22077	35M11 - Lawrence and Brucewood Cres Rebuild	1.4
21190	NY80M4 OH Rebuild (Wires, Transformers, Insulators, Poles) Phase #1	1.4
21785	Overhead Rebuild 51M8 – Leslie TS	1.4
22211	Refurbish Feeder Laterals – Bathurst TS Phase #1	1.3
20773	Churchill/Wynn OH Rehab & Voltage Conversion (SS60-F2 to 80M1)	1.3
20366	Convert Junction 4kV B10J to 13.8kV	1.3
20726	Thorncrest (#011) Rear Lot Electrical Voltage Conversion Phase #1	1.1

Estimate Number	Title	Estimated Cost ($ Millions)
21690	Refurbish Overhear Feeder – Falstaff	1.1
20368	Convert Junction 4kV B5J to 13.8kV	1.1
22184	Refurbish Trunk Feeder - Regent & Wilson	1.0
18669	Convert Existing 4kV Wiltshire MS B2W to 13.8kV System	1.0
20567	Voltage Conversation from 4kV to 13.8kV System TOB4CD	1.0
22203	Overhead Rehab NY53M25	1.0
20858	Convert Feeder SCKHF1	1.0
20965	CSP and OH Conductor Replacement	0.9
21113	Refurbish Overhead Feeder 85M23	0.9
21186	Thorncrest (#011) Rear Lot Voltage Conversion (Electrical) Phase #6	0.9
21721	Gosford/Milo Park Voltage Conversion & DB Cable Replacement	0.9
22040	Weston Railway Overhead Rebuild	0.9
22208	Refurbish Feeder Laterals – Feeder 85M10	0.9
21935	Load Transfer (3MVA) A200E to New 13.8kV Feeder	0.9
21193	NY80M4 OH Rebuild (Wires, Transformers, Insulators, Poles) Phase #2	0.9
20808	Rear Lot #011 Phase #2 Electrical Voltage Conversion	0.8
21999	Clayson/Bartor Trunk Feeder Reconfiguration and Rebuild	0.8
20370	FESI CSP Replacements NYSS58F1	0.8
19775	34M6 - CSP Replacement & Tree Proof Conductor Installation	0.8
22178	Feeder Rehab SCNAR43M30	0.8
21211	Thorncrest (#011) Rear Lot Voltage Conversion Phase #3 (Civil/Electrical)	0.7
20385	CSP and Insulator Replacement (YK11M5) Phase #2	0.7
20412	NY55M25 Overhead Feeder Equipment Rehab	0.7
22229	Overhead Rehab SCREF3	0.7
20774	Voltage Conversion KHF2 SCKHF2	0.7
21123	Refurbish Overhead Feeder 85M23 Phase #4	0.6
22180	Elynhill, Ellerslie, Betty Ann, and Park Home OH Rebuild Phase #2	0.6
20260	Rebuild Windfield MS Area with Voltage Conversion 51M21	0.6
19911	Rebuild Area of MS EA and GB with Voltage Conversion	0.6
21118	Refurbish Overhead Feeder 85M23 Phase #2 of 4	0.5
21122	Refurbish Overhead Feeder 85M23 Phase #3 of 4	0.5
21517	Feeder Rehab and CSP Changeout Phase #1	0.5
21213	Thorncrest (#011) Rear Lot Voltage Conversion Civil/Electrical Phase #4	0.5
21920	80M1 Carney Rd Distribution Rehab	0.5

Estimate Number	Title	Estimated Cost ($ Millions)
21998	80M1 Clarkhill, Glenborough Park, Ancona Overhead Rebuild	0.5
19505	Convert 4kV Wiltshire MS B5w to 13.8kV System	0.5
20476	Convert Junction 4kV B9J to 13.8kV	0.5
21705	Replacement of Existing 600A Porcelain Switches	0.5
20883	Extend 47M13 on Meadowvale S Voltage Conversion - Electrical SCPJF2	0.5
	Total Cost	**92.5**

Portfolio: Overhead

Project Title: Markland Woods Rear Lot Voltage Conversion Phase #1 (Civil)

Project Number: 21484

Project Year: 2013

Estimate Cost: $4,694,313

PROJECT DESCRIPTION

Objective:

The purpose of this project is to construct the first phase of underground civil infrastructure for the eventual conversion of the Markland Woods subdivision from overhead, 4 kV, rear lot plant to underground, front lot, 27.6 kV plant.

Scope:

The scope of work for this project consists of installing civil infrastructure that extends from Burnhamthorpe Road to a new pole that will be installed and runs south along Mill Road, terminating at Toledo Road. The duct bank will then extend eastward along Toledo Road to the ravine green space, Markland Drive and southward to Bloor Street West, where a new termination pole will be installed. Accordingly, the proposed routing for the 1000 MCM CU cable trunk will include five concrete foundations for vista switches and twelve transformer padmount foundations. The conversion of side streets including Cosway Court, Aymarn Court, and Clearside Place, and an additional 8 padmount foundations for transformers on these side streets will also be included.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	MARKLAND WOODS
STATION(S)	MILL MS, NEILSON MS
FEEDER(S)	ETLFF1, ETLFF4, ETBAF4, ETLFF3, ETBAF1, ETLFF2

JUSTIFICATION

Project Background

The rear lot plant in the area of Markland Dr. is approximately 50 years old and is approaching end-of-life conditions. The area has been flagged by field staff as a particularly problematic region for lengthy outages and crew safety. There are many cases of direct buried cross-linked polyethylene (XLPE) cable crossings that exist for the sole purpose of transitioning from the backyards on one side of the street to the backyards on the other side. In addition, the transformers are often on the same pole as the riser and these cables have a history of failures that lead to extensive outages. As a result, THESL expects these cables to fail more frequently as they age and the condition of the overhead plant is very poor in this area.

The typical rear lot safety issues in this neighbourhood are further exacerbated by the presence of non –standard switching equipment such as Positect switches (non-standard, hand-operated load-break switches) and the visibly rotting and unstable poles accompanied by overgrown vegetation. There are several non-standard T-splices in the existing underground plant in the neighbourhood that have the propensity to lengthen outages.

Historical Performance

FEEDER PERFORMANCE	
Worst Performing Feeder Ranking ***(Worst Feeder)***	284
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***	3

HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	23	1, 282	152
Feeder CMO ***(Cumulative)***	3,126	146,068	50,347

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability due to converting rear-lot fed areas and in turn, improving outage duration. Furthermore, replacing aging 4 kV infrastructure, as well as station circuit breakers and switchgear, also contributes to improved reliability.
- Enhances customer satisfaction as a result of improved restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improved life-cycle costs
- Enhances safety and improves accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is to be deferred, it will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of the MS.

Portfolio:	Overhead
Project Title:	Rear Lot Rebuild UG R43M23 Clonmore Briar Dale (Civil)
Project Number:	22033
Project Year:	2013
Estimate Cost:	$ 3,802,570

PROJECT DESCRIPTION

Objective:

The purpose of this project is to construct the underground civil infrastructure for the conversion of the rear lot area bounded by Clonmore Drive, Briar Dale Drive, Woodland Park Drive, and Fallingbrook Road. It preceds the electrical portion for the eventual rear-lot to front-lot conversion in the area bounded by this project.

Scope:

The scope of the project entails installing overhead primary lines from Kingston Road, along Woodland Park Drive to connect with existing overhead on Briar Dale Dr. Subsequently, undergound dips from both Clonmore Drive and Briar Dale Drive will be used to feed the new underground distribution in concrete-encased ductbanks. The general area is bounded by Clonmore Drive, Briar Dale Drive, Woodland Park Drive and Fallingbrook Road. The side streets involved are Elmview, Hunt Club, Ferncroft, Winston and Churchill Dr.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	CLONEMORE
STATION(S)	WARDEN TS
FEEDER(S)	SCNAR43M23

JUSTIFICATION

Project Background

The area bounded by this project is reaching the end of its servicable life and similar to other rear lot areas, there is difficulty in accessing and repairing these rear-lot fed equipment. There are also old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. The rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is the key driving force for implementing this work.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			127
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,797	532	5,295
Feeder CMO ***(Cumulative)***	535,773	78,146	141,958

Benefits

- Improved power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increased reliability, improving outage duration.
- Enhances customer satisfaction as a result of improved restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improves life-cycle costs
- Enhances safety and improves accessibility of front-lot equipment in the event of an outage

as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is deferred, it will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of the MS.

Portfolio: Overhead

Project Title: Convert 4kV Merton Feeder B5MR to 13.8kV System

Project Number: 19977

Project Year: 2013

Estimate Cost: $ 3,095,586

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B5MR, originating from Merton MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Merton MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 13.8kV feeders A22L and A256DX to replace B5MR. The expansion of these feeders includes approximately 5.03 circuit kilometers of overhead conductor, 165 poles, 18 three-phase transformer, and 35 single-phase transformers. The project area is bounded by Balliol Street in the north, Mount Pleasant Road in the east, St. Clair Avenue East in the south, and Oriole Parkway in the west.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DAVISVILLE
STATION(S)	MERTON MS
FEEDER(S)	B5MR

JUSTIFICATION

Project Background

Merton MS was originally built in 1953 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves the aesthetics of the street

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Merton MS and acquire valuable infrastructure for future initiatives.

Portfolio: Overhead

Project Title: Convert Dupont MS 4kV B4DU to 13.8kV

Project Number: 19966

Project Year: 2013

Estimate Cost: $2,958,216

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B4DU, originating from Dupont MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Dupont MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 13.8kV feeder A34W to replace B4DU. The expansion of these feeders includes approximately 4.10 circuit kilometers of overhead conductor, 150 poles and 45 transformer locations. The project area is bounded by Wiltshire Avenue, Bathurst Avenue, St. Clair Avenue West and Dupont Steet.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DUPONT
STATION(S)	DUPONT MS
FEEDER(S)	B4DU

JUSTIFICATION

Project Background

Dupont MS was originally built in 1954 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the overhead design will still persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching useful life.

Portfolio: Overhead

Project Title: Thorncrest (#011) Rear Lot Voltage Conversion Phase #5 (Civil)

Project Number: 21185

Project Year: 2013

Estimate Cost: $2,767,738

PROJECT DESCRIPTION

Objective:

This project is part of a program to upgrade the 4 kV distribution system to27.6kV, and to remove the rear lot plant in the Thorncrest Village area. The purpose of this project in particular is to construct the fifth phase of underground civil infrastructure to accommodate the conversion.

Scope:

This project entails building civil infrastructure to convert approximately 160 customers fed from the rear lot to front lot underground distribution , utilizing low profile transformers. This civil infrastructure is to rise and terminate on two distinct poles on Kipling Ave. The scope of the work includes the installation of 16 single-phase pad foundations, 56 tap boxes, 8,000m of 1–duct trench, and 3900m of 4-duct. The electrical portion of a following project addresses primary and secondary cabling, padmounted transformers and making secondary connection to customers.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	THORNCREST
STATION(S)	RICHVIEW
FEEDER(S)	ET88M13

JUSTIFICATION

Project Background

The Thorncrest Village area is reaching the end of its servicable life and similar to other rear lot areas, there is difficulty in accessing and repairing these rear-lot fed equipment. There are also old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. This rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is one of the key driving force for implementing this work.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			40
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	8,614	10,822	13,822
Feeder CMO ***(Cumulative)***	37,220	92,019	27, 902

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability, improving outage duration.
- Enhances customer satisfaction and improves restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improves life-cycle costs
- Enhances safety and improves accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is to be deferred, it will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of MS.

Portfolio: Overhead

Project Title: Rear Lot #011 Civil Infrastructure Phase #1

Project Number: 20662

Project Year: 2013

Estimate Cost: $2,702,756

PROJECT DESCRIPTION

Objective:

The purpose of this project is to build civil infrastructure to convert rear lot distribution to front lot underground in the area bounded by Princess Margaret Boulevard, Rathburn Road, Islington Avenue and Kipling Avenue. More specifically, this project is the first phase of civil infrastructure as part of the ongoing voltage and rear-lot conversion initiatives.

Scope:

The scope of work for this project is to build civil infrastructure to convert approximately 103 customers fed from the rear lot to the front lot underground utilizing low profile transformers. Also, civil ducts are to be built and stubbed out such that it can be continuously linked with the second phase of civil construction relating to the conversion of rear lot to front lot in this area. There will be approximately 10 single-phase pad foundations, 40 tap boxes, 5000m of 1-duct trench, and 2500m of four-duct trench.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	PRINCESS MARGARET BOULEVARD
STATION(S)	ROSETHORNE MS
FEEDER(S)	SB-F1

JUSTIFICATION

Project Background

The area bounded by this project is reaching the end of its servicable life and similar to other rear lot areas, and there is difficulty in accessing and repairing these rear-lot fed equipment. There are also old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. This rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is one of the key driving force for implementing this work.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			320
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	7	12	990
Feeder CMO ***(Cumulative)***	630	637	27, 299

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability, improving outage duration.
- Enhances customer satisfaction as a result of improved restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improves life-cycle costs
- Enhances safety and improves accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is to be deferred, it will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of MS.

Portfolio: Overhead

Project Title: Carlaw 4kV Conversion B1E & B13E (Part of Tie B11E)

Project Number: 22022

Project Year: 2013

Estimate Cost: $ 2,763,399

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeders B1E and B13E, and partially convert the existing standby feeder B11E, all originating from Carlaw MS, to 13.8kV. This project is one phase of a multi-phase program that began in 2009 to convert the entire 4kV load at Carlaw MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to install a new feeder from Carlaw TS to replace B1E and B13E. The installation of the new 13.8kV feeder includes approximately 4.5 circuit kilometers of overhead conductor, 155 poles, 39 single-phase transformers, and eight three-phase transformers. The project area is bounded by Riverdale Avenue in the north, Prust Avenue in the east, Dundas Street East in the south, and Carlaw Avenue in the west.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	LESLIEVILLE
STATION(S)	CARLAW MS
FEEDER(S)	B1E, B13E, B11E

JUSTIFICATION

Project Background

Carlaw MS was originally built in the 1950's and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available space and infrastructure within the footprint of Carlaw Station to install new switchgears to allow for maintenance or capacity upgrades.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves the aesthetics of the street

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Carlaw MS and acquire valuable infrastructure for future initiatives.

Portfolio:	Overhead
Project Title:	Convert Wiltshire 4kV B6W to 27.6kV
Project Number:	19736
Project Year:	2013
Estimate Cost:	$2,530,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B6W, originating from Wiltshire MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2013 to convert the entire 4kV load at Wiltshire MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to build two new 13.8kV feeders from Wiltshire TS to replace B6W. The expansion of these feeders includes approximately 2.20 circuit kilometres of overhead conductor, 80 poles and 28 transformer locations. The project area is bounded by Mc Roberts Avenue, Gilbert Avenue, Rogers Road and St. Clair Avenue West.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WILTSHIRE
STATION(S)	WILTSHIRE MS
FEEDER(S)	B6W

JUSTIFICATION

Project Background

Wiltshire MS was originally built in 1949 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would

also result in THESL losing the opportunity to complete the multi-phase program started in previous years in order to fully decommission Wiltshire MS and acquire valuable infrastructure for future initiatives.

Portfolio:	Overhead
Project Title:	Convert 4kV Dupont B6DU to 13.8kV
Project Number:	19984
Project Year:	2013
Estimate Cost:	$ 2,433,285

PROJECT DESCRIPTION

Objective:

The purpose of this project is to convert the existing B6DU from Dupont MS from 4kV to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Dupont MS, with the final objective of decommissioning Dupont MS. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV loads at Dupont MS, with the final objective of decommissioning Dupont MS.

Scope:

The scope of the project includes the replacing existing 4kV infrastructure with 13.8kV infrastructure. Use the existing alignment along B6DU for the new 13.8kV feeder. This project will remove 500M of underground cable and 2500M of overhead conductor, 130 poles will be replaced and 37 transformers will be replaced. The boundaries for this project are Winona Drive, Dufferin, Saint Clair West and Geary Ave.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ST. CLAIR & DUFFERIN
STATION(S)	DUFFERIN MS
FEEDER(S)	B6DU

JUSTIFICATION

Project Background

Dupont was originally built in 1954 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. The existing 4kV feeders are overhead design and are difficult to maintain, as they are from an obsolete distribution standard. There are also currently a high number of assets past their useful life on these feeders.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).In addition, the project needs to be carried out to accommodate residential “load creep” as well as load increase from future emerging businesses in the area.

Benefits

- Improves the safety of THESL crew workers and the public
- Reduces of maintenance costs by removing obsolete 4kV equipment
- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Improves the aesthetics of the street
- Reduces system losses when 4kV is upgraded to 13.8kV

IMPACT OF DEFERRAL

Deferral of this project will prolong the safety concerns for field crews related to box construction design. The risk of equipment failure will be high due to the presence of number of assets past their useful life. Deferral of this project will also result in high maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard 13.8kV equipment.

Portfolio:	Overhead
Project Title:	Convert 4kV Dupont B7DU to 13.8kV
Project Number:	19976
Project Year:	2013
Estimate Cost:	$ 2,217,170

PROJECT DESCRIPTION

Objective:

The purpose of this project is to convert the existing B7DU from Dupont station from 4kV to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Dupont MS, with the final objective of decommissioning Dupont MS.

Scope:

This scope includes the replacement of existing 4kV infrastructure with 13.8kV infrastructure. This project will replace 2,770m of underground cable and 4,030m of overhead conductor, 145 poles will be replaced and 38 transformers will be replaced.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ST. CLAIR & BATHURST
STATION(S)	DUFFERIN MS
FEEDER(S)	B7DU

JUSTIFICATION

Project Background

Dupont was originally built in 1954 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. The existing 4kV feeders are overhead design and are difficult to maintain, as they are from an obsolete distribution standard. There are currently a high number of assets past their useful life on these feeders. When 50% of assets in a specific asset class are expected to fail, assets are considered past their useful life.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

In addition, the project needs to be carried out to accommodate residential load creep as well as load increase from future emerging businesses in the area.

Benefits

- Improves the safety of THESL crew workers and the public
- Reduced maintenance costs by removing obsolete 4kV equipment
- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Increased capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Improves in the aesthetics of the street
- Reduced system losses

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Dupont MS and acquire valuable infrastructure for future initiatives.

Portfolio:	Overhead
Project Title:	Millwood MS: B2MD, Merton MS:B1MR, Partial Voltage Conversion TOB2MD, TOB1MR
Project Number:	18738
Project Year:	2013
Estimate Cost:	$ 2,266,017

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeders B2MD and B1MR, originating from Millwood MS and Merton MS respectively, to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Merton MS and Millwood MS, with the final objective of decommissioning both stations.

Scope:

The scope of work for this project is to expand the existing 13.8kV feeder A21L to replace B2MD and B1MR. The expansion of this feeder includes approximately 5.40 circuit kilometers of overhead conductor, 136 poles, and 19 overhead transformers. The project area is bounded by Manor Road East in the north, Bayview Avenue in the east, Belsize Drive in the south, and Mount Pleasant Road in the west.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DAVISVILLE
STATION(S)	MERTON MS, MILLWOOD MS
FEEDER(S)	B2MD, B1MR

JUSTIFICATION

Project Background

Merton MS and Millwood MS were both originally built in the 1950’s and have already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once either MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

In addition, the existing feeders B2MD and B1MR from Millwood MS and Merton MS are of overhead design, which is no longer the distribution standard. Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves the aesthetics of the street

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in previous years in order to fully decommission Merton and Millwood MS and acquire valuable infrastructure for future initiatives.

Portfolio:	Overhead
Project Title:	CSP and Conductor Replacement 35M24
Project Number:	20565
Project Year:	2013
Estimate Cost:	$2,016,296

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, glass insulators, arrestors and rebuild feeder 35M24 overhead primary distribution with tree proof conductor in order to improve reliability.

Scope:

The scope of work for this project is to replace 127 CSP transformers, as well as glass insulators and arrestors. Also, due to end of life conditions, spot replacement of poles will be undertaken. The boundaries for this project are Dufflaw Road, Culford Road, Falstaff Avenue and Lawrence Avenue

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	LAWRENCE AVENUE
STATION(S)	FAIRBANKS II TS
FEEDER(S)	NY35M24

JUSTIFICATION

Project Background

Feeder 35M24 has sustained nine interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During the past ten years, this feeder has sustained 40 outages due to overhead defective equipment. Furthermore, 20 of these outages were caused by transformer failures.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			150
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	252	3,944	3,283
Feeder CMO ***(Cumulative)***	152,028	105,183	145,557

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents

- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel and approximately 2,000 customers will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also have a significant impact of feeder reliability. Customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Convert Wiltshire B1W to 13.8kV

Project Number: 19748

Project Year: 2013

Estimate Cost: $2,011,523

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B1W, originating from Wiltshire MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2013 to convert the entire 4kV load at Wiltshire MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to build two new 13.8kV feeders from Wiltshire TS to replace B1W. The expansion of these feeders includes approximately 2.16 circuit kilometres of overhead conductor, 86 poles and 24 transformer locations. The project area is bounded by Wiltshire Avenue, Osler Street, St. Clair Avenue West and Adrian Avenue.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WILTSHIRE
STATION(S)	WILTSHIRE MS
FEEDER(S)	B1W

JUSTIFICATION

Project Background

Wiltshire MS was originally built in 1949 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would

also result in THESL losing the opportunity to complete the multi-phase program started in previous years in order to fully decommission Wiltshire MS and acquire valuable infrastructure for future initiatives.

Portfolio: Overhead

Project Title: 35M11 - Bathurst and Lawrence Rebuild

Project Number: 21859

Project Year: 2013

Estimate Cost: $ 1,918,534

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, glass insulators, arrestors and rebuild end of life assets on feeder 35M11 in order to improve reliability. This project is one part of four related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 60 poles, as well as non-standard glass insulators and arrestors, as well as 1,500 meters of overhead conductor. The rebuild boundaries for this project is primarily along Bathurst Street near Lawrence Avenue.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	BATHURST & LAWRENCE
STATION(S)	FAIRBANK TS
FEEDER(S)	NY35M11

JUSTIFICATION

Project Background

Failures on 35M11 are usually attributable to overhead equipment failures and contacts by animals. The primary overhead distribution plant on 35M11 requires short-term targeted rehabilitation in order to address reliability concerns. Furthermore, the poles are in poor condition.

Feeder 35M11 has sustained four interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During 2010, this feeder experienced over 2,000,000 customer minutes out and over 20,000 customer interruptions. There has been a growing trend in CSP transformer failures in this project area and with the non-standard equipment such as porcelain insulators, arrestors and switches.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			91
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	10,442	10,185	23,053
Feeder CMO ***(Cumulative)***	56,619	45,908	2,071,789

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Reduced outage durations and reverse SAIDI trends that have been worsening over the past

few years

- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel and approximately 400 customers will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio:	Overhead
Project Title:	B3HW and B5HW Conversion and Transfer to A200E
Project Number:	20919
Project Year:	2013
Estimate Cost:	$ 1,900,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to convert the remaining portions of existing 4kV feeders B3HW and B5HW, originating from Hazelwood MS to 13.8kV. This project is one phase of a multi-phase program that began in 2009 to convert the entire 4kV load at Hazelwood MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to temporarily expand existing 13.8kV feeder A200E to replace B3HW and B5HW. An additional project will then relieve feeder A200E of the additional B3HW and B5HW load, and transfer it onto a new 13.8kV feeder. The expansion of the existing feeder A200E includes approximately 3.40 circuit kilometers of overhead conductor, 127 poles, 39 single-phase transformers, and six three-phase transformers. The project area is bounded by Danforth Avenue in the north, Coxwell Avenue in the east, Felsted Avenue in the south, and Jones Avenue in the west.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	LESLIEVILLE
STATION(S)	HAZELWOOD MS
FEEDER(S)	B3HW, B5HW

JUSTIFICATION

Project Background

The transformers in service at Hazelwood MS are approaching end of life and some have been in service for over 50 years. In order to avoid replacing the transformers at Hazelwood MS, an initiative to decommission the entire MS and convert all feeders to 13.8kV was created. Inspections and maintenance reports on the existing transformers at Hazelwood MS show that they require replacement no later than 2013.

Several Hazelwood 4kV feeders have already been converted and only three remain. This project to convert and decommission B3HW and B5HW is one of two projects created to convert the remaining feeders and once complete Hazelwood MS can be decommissioned.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves the aesthetics of the street

IMPACT OF DEFERRAL

Prolonged safety concerns for field crews related to box construction design will continue to persist. THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. In addition, deferring this project will require THESL to purchase new power transformers for Hazelwood MS, as they have reached end of life.

Portfolio: Overhead

Project Title: Thorncrest (#011) Rear Lot Civil Infrastructure Phase #2

Project Number: 20714

Project Year: 2013

Estimate Cost: $1,853,256

PROJECT DESCRIPTION

Objective:

The purpose of this project is to build civil infrastructure to convert rear lot distribution to front lot underground in the area bounded by Princess Margaret to the north and Rathburn to the south between Islington and Kipling Ave.

Scope:

The scope of work for this project is to install 8 single-phase pads, 30 tap boxes and 5 duct trenches. Civil infrastructure will be built to convert approximately 85 customers.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	PRINCESS MARGARET BOULEVARD
STATION(S)	LONGFIELD MS
FEEDER(S)	BHF2

JUSTIFICATION

Project Background

THES intends to proactively remove the distribution system from the rear lots of customer properties. These rear lot feeders have become a source of concern for public and personnel safety. The age and difficulty of accessing THESL owned equipment are key drivers for implementing this work. The assets bounded by this scope are over 40 years old and have approached end-of-life conditions. Due to crew access limitations, outages are typically much longer than normal. This area is proposed to be designed using the option of underground pad mounted low-profile transformers with primary and secondary underground, except for areas where 27.6kV can be maintained overhead.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			310
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	358	0	64
Feeder CMO ***(Cumulative)***	7,732	0	5,600

Benefits

- Higher primary voltage will have lower line losses and higher transmission efficiency
- Replacing aging 4kV infrastructure and converting to a higher voltage will provide more reliability due to new equipment
- Helps remove obsolete breaker and switchgear equipment in the MS station
- Converting the rear lot areas will improve reliability (particularly outage duration)
- Reduce inventory and maintenance costs related to maintaining obsolete 4 kV distribution equipment and stations
- Quick access to the equipment in the event of the outage

IMPACT OF DEFERRAL

The lack of access presents safety hazards to crews during emergency outage situations.
A failure to keep up with required rear lot renewal will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the

neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot areas.

Portfolio: Overhead

Project Title: Pole Replacement and Voltage Conversion Along Renforth

Project Number: 20721

Project Year: 2013

Estimate Cost: $ 1,866,123

PROJECT DESCRIPTION

Objective:

The purpose of this project is to partially convert 4kV customers from feeders BA-F3 and KK-F4 from Neilson Drive MS and Burnhamthorpe MS respectively. Also an objective is to replace end-of-life poles on Renforth Drive (from Burnhamthorpe to just north of Bloor).

Scope:

The scope of this project includes the replacement of 30 of 35 poles along Renforth Drive. It also includes the conversation of 4 kV load on feeder BA-F3 and feeder KK-F4 onto feeder 88M11. The project includes the replacement of 145 poles, 100 spans of overhead primary conductor, 148 spans of secondary conductor and 29 transformers. Also, in order to maintain contingency on the surrounding 4 kV feeders, a new tie point will be proposed between feeders KK-F4 and KK-F3. The area bounded by this project is West Mall, Saturn Road, Burnhamthorpe Road and Bloor Street.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	RENFORTH- BURNHAMTHORPE
STATION(S)	RICHVIEW
FEEDER(S)	ET88M11

JUSTIFICATION

Project Background

Originally, Neilson Drive MS and Burnhamthorpe MS were built in the 1950's to 1960's and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. This project is intended to replace end of life 4kV and 27.6 kV plant. In order to replace the poor performing high impact trunk portion of the feeder along Renforth Drive, the 4kV laterals supplied by this portion is required to be replaced as well. This feeder is one of the worst performing feeders. In addition, the project needs to be carried out to accommodate residential load creep as well as load increase from future emerging businesses in the area.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			50
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,726	2,996	12,909
Feeder CMO ***(Cumulative)***	7,303	408,751	372,316

Benefits

- Modernizes the distribution plant as a result of replacement of end-of-life assets resulting in improvement to feeder reliability (both outage duration and frequency)
- Eliminates electrical and fall hazards as a result of pole replacement
- Minimizes line losses by removing the 4 kV plant
- Reduces probability of further outages by upgrading sizes of transformers at overloaded sites and replacing poor performing transformer types
- Replaces poor performing non-standard assets.
- Reduces of maintenance costs by removing obsolete 4kV equipment

- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Increases capacity with 27.6kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Improves in the aesthetics of the street

IMPACT OF DEFERRAL

Deferral would likely result in continued deterioration of the plant. This will result in continued worsening reliability since the assets bounded by this project have already approached end-of-life conditions. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 27.6kV equipment.

Portfolio: Overhead

Project Title: Convert Junction 4kV B11J to 13.8kV

Project Number: 20369

Project Year: 2013

Estimate Cost: $1,745,107

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B11J, originating from Junction MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Junction MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 13.8kV feeder A530DN to replace B11J. The expansion of these feeders includes approximately 2.60 km of overhead conductor, 111 poles and 33 transformer locations. The project area is bounded by Lansdowne Avenue, Osler Street, Ruskin Avenue and Davenport Avenue.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	JUNCTION
STATION(S)	JUNCTION MS
FEEDER(S)	B11J

JUSTIFICATION

Project Background

Junction MS was originally built in 1929 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would

also result in THESL losing the opportunity to complete the multi-phase program started in previous years in order to fully decommission Junction MS and acquire valuable infrastructure for future initiatives.

Portfolio: Overhead

Project Title: Refurbish Overhead Feeder - Epsom Downs

Project Number: 21639

Project Year: 2013

Estimate Cost: $1,647,640

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild / replace the aging and/or non standard primary overhead distribution equipment on feeder 55M28 in order to improve reliability and replace the XLPE lateral services with tree retardant cable to improve reliability. This project is one part of seven related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 157 poles, 1,500 meters of overhead conductor, and 42 non-standard transformers. Also, poor performing assets such as non-standard glass insulators and arrestors will be replaced as well. In addition, undersized primary overhead conductor will be replaced to standard size. In areas where underground laterals are serviced with early vintage XLPE cable, it will be replaced with standard tree retardant cable.
The boundaries of this project are Calais, Jane, Wilson and Richard Clark.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	EPSOM DOWNS
STATION(S)	FINCH II TS
FEEDER(S)	NY55M28

JUSTIFICATION

Project Background

Feeder 55M28 has sustained five interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP (completetely self protected) transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a 8 serious public safety hazard. During 2010 this feeder has experienced over 7,000 customer interruptions as well as over 240,000 customer minutes out. As a result, this feeder is now ranked 86th in the worst performing feeder list.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			86
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	13,745	72	7,706
Feeder CMO ***(Cumulative)***	340,712	40,572	240,636

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years

- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the pole top, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Carlaw 4kV Conversion B5E

Project Number: 22151

Project Year: 2013

Estimate Cost: $ 1,610,644

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B5E and partially convert the existing standby feeder B11E, originating from Carlaw MS, to 13.8kV. This project is one phase of a multi-phase program that began in 2009 to convert the entire 4kV load at Carlaw MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to install a new feeder from Carlaw TS to replace B5E. The installation of the new 13.8kV feeder includes approximately 2.50 circuit kilometers of overhead conductor, 85 poles, 30 single-phase transformers, and four three-phase transformers. The project area is bounded by Gerrard Street in the north, Leslie Street in the east, Queen St East in the south, and Carlaw Avenue in the west.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	LESLIEVILLE
STATION(S)	CARLAW MS
FEEDER(S)	B5E, B11E

JUSTIFICATION

Project Background

Carlaw MS was originally built in the 1950's and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available space and infrastructure within the footprint of Carlaw Station to install new switchgears to allow for maintenance or capacity upgrades.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves the aesthetics of the street

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Carlaw MS and acquire valuable infrastructure for future initiatives.

Portfolio:	Overhead
Project Title:	Convert Wiltshire 4kV B3W to 13.8kV
Project Number:	19462
Project Year:	2013
Estimate Cost:	$1,521,301

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B3W, originating from Wiltshire MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2013 to convert the entire 4kV load at Wiltshire MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to build two new 13.8kV feeders from Wiltshire TS to replace B3W. The expansion of these feeders includes approximately 1.40 km of overhead conductor, approximately 0.70 km of underground cable and 50 poles. The project area is bounded by Wiltshire Avenue, Osler Road, Davenport Avenue and Adrian Street.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WILTSHIRE
STATION(S)	WILTSHIRE MS
FEEDER(S)	B3W

JUSTIFICATION

Project Background

Wiltshire MS was originally built in 1949 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Wiltshire MS and acquire valuable infrastructure for future initiatives.

Portfolio:	Overhead
Project Title:	35M11 – Lawrence and Brucewood Cres Rebuild
Project Number:	22077
Project Year:	2013
Estimate Cost:	$ 1,498,317

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, glass insulators, arrestors and rebuild end of life assets on feeder 35M11 in order to improve reliability. This project is one part of four related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 100 poles, as well as non-standard glass insulators and arrestors, as well as 2,500 meters of overhead conductor. The rebuild boundaries for this project is primarily along Bathurst Street near Lawrence Avenue.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	LAWRENCE & BRUCEWOOD
STATION(S)	FAIRBANK TS
FEEDER(S)	NY35M11

JUSTIFICATION

Project Background

Failures on 35M11 are usually attributable to overhead equipment failures and contacts by animals. The primary overhead distribution plant on 35M11 requires short-term targeted rehabilitation in order to address reliability concerns. Furthermore, the poles are in poor condition.

Feeder 35M11 has sustained four interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During 2010, this feeder experienced over 2,000,000 customer minutes out and over 20,000 customer interruptions. There has been a growing trend in CSP transformer failures in this project area and with the non-standard equipment such as porcelain insulators, arrestors and switches.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			91
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	10,442	10,185	23,053
Feeder CMO ***(Cumulative)***	56,619	45,908	2,071,789

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the

past few years

- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to Increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: NY80M4 Overhead Rebuild (Wires, Transformers, Insulators, Poles) Phase 1

Project Number: 21190

Project Year: 2013

Estimate Cost: $ 1,417,145

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, glass insulators, arrestors and rebuild end of life assets on feeder 80M4 in order to improve reliability. This project is one part of five related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 150 end of life poles,70 CSP transformers, as well as non-standard glass insulators and arrestors. In addtion, approximately 500 meters of overhead conductor will be,replaced as well. The rebuild streets for this projects are Abitibi Avenue, Aneta Circle, Cadmus Road, Caswell Drive, Conacher Drive, Centre Avenue, Greenyards Drive, Lillian Street, Lloydminister Crescent, Madawasska Avenue, Michigan Drive, Montiford Drive, Nipigon Avenue, Newton Drive, Otonabee Avenue, Pamcrest Drive and Toffoli Place.

DISTRICT	North York
DISTRICT NEIGHBOURHOOD	Yonge Street
STATION(S)	Fairchild I TS(27.6 kV)
FEEDER(S)	NY80M4

JUSTIFICATION

Project Background

Feeder 80M4 has sustained 11 interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a 8 serious public safety hazard. During the past ten years, this feeder has sustained 30 outages due to overhead defective equipment. Furthermore, during 2010 this feeder experienced over 400,000 customer minutes out and almost 7,000 customer interruptions. This has resulted in a feeder rank of 26th in the worst performing feeder list.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			26
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			11
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	616	1,948	6,980
Feeder CMO ***(Cumulative)***	67,047	50,189	402,591

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the

past few years

- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Overhead Rebuild 51M8 – Leslie TS

Project Number: 21785

Project Year: 2013

Estimate Cost: $ 1,386,546

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, glass insulators, arrestors and rebuild feeder 51M8 overhead primary distribution with tree proof conductor in order to improve reliability. The scope also includes installation of a SCADA switch. This cope is one part of 4 related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 100 poles, 33CSP transformers, as well as glass insulators and arrestors. The boundaries for this project are Yonge, Leslie, Cummer, and Sheppard..

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	FINCH
STATION(S)	LESLIE I TS
FEEDER(S)	NY51M8

JUSTIFICATION

Project Background

Feeder 51M8 has sustained seven interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During the past ten years, this feeder has sustained over 20 overhead related outages. Furthermore, customer minutes out and has more than doubled over the last three years. As a result, this feeder is ranked 91st in the worst performing feeder list.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			91
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			7
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,601	6,124	2,277
Feeder CMO ***(Cumulative)***	69,249	167,213	158,038

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions
- Improves restoration time in the event of an outage due to installation of remote fault sensing switch

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Refurbish Feeder Laterals – Bathurst TS Phase #1

Project Number: 22211

Project Year: 2013

Estimate Cost: $1,378,602

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace end of life asset and non-standard CSP transformers, glass insulators, arrestors on feeder 85M10 overhead. This project is one part of two related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 110 poles, 37 non-standard transformers, as well as non-standard glass insulators and arrestors. The rebuild boundaries for this project is Dufferin, Keele, Wilson and Whitley

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DOWNSVIEW-RODING-CFB
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M10

JUSTIFICATION

Project Background

Failures on 85M10 are usually attributable to overhead equipment failures. The primary overhead distribution plant on85M10 requires short-term targeted rehabilitation in order to address reliability concerns. Furthermore, the poles are in poor condition.

Feeder 85M10 has sustained four interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			213
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,047	2,010	87
Feeder CMO ***(Cumulative)***	1,728,172	69,273	17,872

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Churchill/Wynn OH Rehab & Voltage Conversion (SS60-F2 to 80M1))

Project Number: 20773

Project Year: 2013

Estimate Cost: $ 1,303,597

PROJECT DESCRIPTION

Objective:

The purpose of this project is to partially convert feeder NYSS60F2 from Churchill MS from 4kV to 27.6kV. This project is one phase of a multi-phase program to convert the entire 4kV load at Churchill MS, with the final objective of decommissioning Churchill MS. Also the intent of this project is to to improve the reliability of service and rehab of the poor condition plant supplied by 4kV feeder NYSS60F2 (Churchill MS).

Scope:

The scope of this project includes converting the following 4.16 kV system (Churchill MS, SS60-F2) to a 27.6kV distribution system utilizing 80M1 on Wynn Road, Hosham Avenue, Hounslow Avenue, Yorkview Drive, Muirkirk Road, Wallbridge Court, Fleetwell Court, and Finchurst Drive. In total, approximately 120 poles, 23 single-phase pole top transformers, 3 single-phase banked pole top transformers, one three-phase padmounted transformer and 7,700m of overhead primary and secondary lines will be replaced.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	CHURCHILL/WYNN
STATION(S)	CHURCHILL MS
FEEDER(S)	NYSS60F2

JUSTIFICATION

Project Background

Churchill MS was originally built in 1961 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. The area supplied by NYSS60F2 is in poor condition. It consists of very poor condition poles as well as non-standard overhead assets; namely glass insulators, glass switches, conductors, pole heights, clearances, glass lightning arrestors, animal guards, and transformers.

The area is currently supplied by Churchill MS. This is a 4kV station with two feeders. Feeder F3 will be converted to 27.6 kV as per project W11355. This project will continue the rehab of the area by converting feeder F2. In addition, the project needs to be carried out to accommodate residential load creep as well as load increase from future emerging businesses in the area.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			108
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	0	15	0
Feeder CMO ***(Cumulative)***	0	375	0

Benefits

- Modernizes the distribution plant as a result of replacement of end-of-life assets
- Eliminates safety hazards as a result of pole replacement
- Reduces maintenance costs by removing obsolete 4kV equipment
- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment

- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Improves the aesthetics of the street
- Minimizes line losses by removing the 4 kV plant and higher transmission efficiency
- Reduces probability of further outages by upgrading sizes of transformers at overloaded sites and replacing poor performing transformer types
- Helps recover obsolete breaker and switchgear equipment in MS station

IMPACT OF DEFERRAL

Consequences of deferral will lead to high maintenance costs of 4kV station equipment. This difficulty and delay in obtaining spare parts will contribute to outages.

Portfolio: Overhead

Project Title: Convert Junction 4kV B10J to 13.8kV

Project Number: 20366

Project Year: 2013

Estimate Cost: $1,332,795

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B10J, originating from Junction MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Junction MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 13.8kV feeders A257DN and A258DN to replace B10J. The expansion of these feeders includes approximately 1.47 km of overhead conductor, 60poles and 17 transformer locations. The project area is bounded by Dundas Street, Sunnyside Avenue, Dupont Avenue and Garden Avenue.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	JUNCTION
STATION(S)	JUNCTION MS, DUFFERIN TS
FEEDER(S)	B10J, A257DN, A258DN

JUSTIFICATION

Project Background

Junction MS was originally built in 1929 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Junction MS and acquire valuable infrastructure for future initiatives.

Portfolio: Overhead

Project Title: Thorncrest (#011) Rear Lot Electrical Voltage Conversion Phase #1

Project Number: 20726

Project Year: 2013

Estimate Cost: $1,174996

PROJECT DESCRIPTION

Objective:

The purpose of this project is to build electrical equipment to convert rear lot distribution to front lot underground in the area bounded by Princess Margaret Boulevard, Rathburn Road, Islington Avenue and Kipling Avenue. More specifically, this project is the first phase of electrical work in the area bounded by this project.

Scope:

This project is executed following all civil construction in the area bounded by this project, where 103 customers are fed from rear lot. TRXLPE primary risers will be installed and used as a single-phase primary loop that will be connected to the red phase of 88M13. In summary, 10 single-phase transformers, 103 service connections in tap boxes, 5500m of secondary service conductor, and 2500m of 1/0 TRXLPE 27.6kV conductor will be installed. Thereafter, all poles, lines, transformers and switches in the rear lot associated with this conversion will be removed.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	PRINCESS MARGARET BLVD
STATION(S)	ROSETHORNE
FEEDER(S)	ETSBF1

JUSTIFICATION

Project Background

The area bounded by this project is reaching the end of its servicable life and similar to other rear lot areas, there is difficulty in accessing and repairing these rear-lot fed equipment. There are also old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. This rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is one of the key driving force for implementing this work.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			320
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	7	12	990
Feeder CMO ***(Cumulative)***	630	637	27,299

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability due to converting rear-lot fed areas and in turn, improving outage duration.
- Enhances customer satisfaction as a result of Improves restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improves life-cycle costs

- Enhances safety and improves accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is deferred, safety hazards to crews during emergency outage situations would continue. Delayed rear lot renewal will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of the MS.

Portfolio:	Overhead
Project Title:	Refurbish Overhear Feeder – Falstaff
Project Number:	21690
Project Year:	2013
Estimate Cost:	$1,129,182

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild and/or replace the aging and/or non standard primary OH distribution equipment on feeder 55M28 in order to improve reliability and replace the XLPE lateral services with tree retardant cable to improve reliability. This project is one part of seven related projects to rehabilitate this feeder.

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Scope:

The scope of work for this project is to replace 110 poles, and 20 non-standard transformers. Also, poor performing assets such as non-standard glass insulators and arrestors will be replaced as well. In addition, undersized primary overhead conductor will be replaced to standard size. In areas where underground laterals are serviced with early vintage XLPE cable, it will be replaced with standard tree retardant cable. The boundaries of this project are Bannerman Street, Jane Street, Falstaff Avenue, and Lawnside Drive.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	FALSTAFF
STATION(S)	FINCH II TS
FEEDER(S)	NY55M28

JUSTIFICATION

Project Background

Feeder 55M28 has sustained five interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a 8 serious public safety hazard. During 2010 this feeder has experienced over 7,000 customer interruptions as well as over 240,000 customer minutes out. As a result, this feeder is now ranked 86th in the worst performing feeder list.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			86
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	13,745	72	7,706
Feeder CMO ***(Cumulative)***	340,712	40,572	240,636

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years

- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio:	Overhead
Project Title:	Convert Junction 4kV B5J to 13.8kV
Project Number:	20368
Project Year:	2013
Estimate Cost:	$1,745,107

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B5J, originating from Junction MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Junction MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 13.8kV feeders A251DN and A258DN to replace B5J. The expansion of these feeders includes approximately 1.10 circuit kilometers of overhead conductor, 50 poles and 11 transformer locations. The project area is bounded by Sterling Road, Indian Road, Bloor Avenue and Grenadier Road.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	JUNCTION
STATION(S)	JUNCTION MS
FEEDER(S)	B5J, A251DN, A258DN

JUSTIFICATION

Project Background

Junction MS was originally built in 1929 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Junction MS and acquire valuable infrastructure for future initiatives.

Portfolio: Overhead

Project Title: Refurbish Trunk Feeder - Regent & Wilson

Project Number: 22184

Project Year: 2013

Estimate Cost: $1,002,973

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild and/or replace the aging and/or non standard primary overhead distribution equipment on feeder 85M10 in order to improve reliability and replace the XLPE lateral services with tree retardant cable to improve reliability. This project is one part of three related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 65 poles, and 20 non-standard transformers. Also, poor performing assets such as non-standard glass insulators and arrestors will be replaced as well. In addition, undersized primary overhead conductor will be replaced to standard size. In areas where underground laterals are serviced with early vintage XLPE cable, it will be replaced with standard tree retardant cable. The boundaries of this project are Dufferin Street , Murray Road, and Wilson Avenue

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DOWNSVIEW-RODING-CFB
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M10

JUSTIFICATION

Project Background

Feeder 85M10 has sustained four interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose serious public safety hazard. During 2008 this feeder has experienced almost 2,000,000 customer minutes out. Over the past ten years, this feeder experienced over 50 overhead related outages of which 20 of these were transformer related.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			213
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,047	2,010	87
Feeder CMO ***(Cumulative)***	1,728,172	69,273	17,872

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents

- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Convert Wiltshire 4kV B2W to 13.8kV

Project Number: 18669

Project Year: 2013

Estimate Cost: $1,080,758

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B2W, originating from Wiltshire MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2013 to convert the entire 4kV load at Wiltshire MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to build two new 13.8kV feeders from Wiltshire TS to replace B2W. The expansion of these feeders includes approximately 2.00 km of overhead conductor, approximately 1.00 km of underground cable and 70 poles. The project area is bounded by Gillespie Avenue, St. Clair Avenue West, Old Weston Road and CPR right of way.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WILTSHIRE
STATION(S)	WILTSHIRE MS
FEEDER(S)	B2W

JUSTIFICATION

Project Background

Wiltshire MS was originally built in 1949 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Wiltshire MS and acquire valuable infrastructure for future initiatives.

Portfolio: Overhead

Project Title: Voltage Conversation from 4kV to 13.8kV System TOB4CD

Project Number: 20567

Project Year: 2013

Estimate Cost: $ 1,041,530

PROJECT DESCRIPTION

Objective:

The purpose of this project is to convert the existing 4kV feeder B4CD originating from College MS to 13.8kV, with the long term plan of decommissioning College MS.

Scope:

The scope of work for this project is to expand existing 13.8kV feeder A490DN to replace B4CD. The installation of the feeder includes approximately 0.85 km of overhead conductor, 50 poles, and 23 transformers. The project area is bounded by College Street in the north, Shaw Street in the east, Harrison Street in the south, and Dovercourt Road in the west.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	COLLEGE
STATION(S)	COLLEGE MS
FEEDER(S)	B4CD

JUSTIFICATION

Project Background

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables). Converting B4CD feeder to 13.8kV is part of an overall plan to decommission College MS. Once the MS is decommissioned, THESL will then have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves the aesthetics of the street

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Lastly, if this work is deferred, there is a higher risk of failure due to the number of assets past useful life.

Portfolio: Overhead

Project Title: Overhead Rehab NY53M25

Project Number: 22203

Project Year: 2013

Estimate Cost: $ 972,586

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild / replace the aging and/or non standard primary overhead distribution equipment on feeder 53M25 in order to improve reliability. This project is one part of eight related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 200 poles, Also, poor performing assets such as non-standard glass insulators and arrestors will be replaced as well. In addition, undersized primary overhead conductor will be replaced to standard size. The boundaries of this project are Evermede Drive, Billington Crescent, Skelmore Crescent, Marbury Crescent, Lynedock Crescent and Fenside Drive.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	YORK MILLS ROAD
STATION(S)	BERMONDSEY IL TS(27.6 KV)
FEEDER(S)	NY53M25

JUSTIFICATION

Project Background

Feeder 53M25 has sustained nine interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a 8 serious public safety hazard. During 2009 this feeder has experienced almost 20,000 customer interruptions as well as over 600,000 customer minutes out. As a result, this feeder is now ranked 9th in the worst performing feeder list.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			176
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	260	19,054	563
Feeder CMO ***(Cumulative)***	51,265	638,856	70,033

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment

such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio:	Overhead
Project Title:	Overhead Rehab NY53M25
Project Number:	20858
Project Year:	2013
Estimate Cost:	$ 954,142

PROJECT DESCRIPTION

Objective:

The objective of this project is convert KHF1 fed from Brimley Sheppard MS from 4kV to 27.6kV. This project mainly addresses the conversion of KHF1 but is one phase in a multi-phase program to convert 4kV loads, with the final objective of decommissioning Brimley Sheppard MS. The converted load will be transferred to feeders NT63M5 and NAE5-1M24.

Scope:

The scope of work for this project includes spot convert of overhead transformers: on Brimley Rd to E5-1M24, on Midland S of Sheppard to NT63M5. Installation of CE duct along Midland Avenue, Emblem Court. Installation of three-phase overhead line along Pitfield Road from Brimley Road to Midland Ave. Installation of single-phase overhead lateral lines with from Pitfield to Murray Ave, Garden Park Avenue, McDairmid Road, Marilake Drive (both legs), Manorglen Crescent, sub-lateral from Marilake Drive to Summerglade Drive and Rosegrove Place. Convert all the existing Pole top transformers .

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	PITFIELD ROAD
STATION(S)	BRIMLEY SHEPPARD
FEEDER(S)	SCKHF1

JUSTIFICATION

Project Background

Brimley Sheppard (KH) MS station was built in 1965. As a result, both transformer and 13.8kV breakers are very old and have already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. The 13.8kv distribution system is also old. There were several failures on the primary cables installed direct buried. The oil circuit breakers have reached their end of life. There are PILC cables on both sides (27.6 and 13.8kV) of the transformer. To reduce the maintenance cost from the station and distribution equipment and to modernize the electrical distribution, THESL will convert the distribution fed from this MS with the latest 27.6kV assets and with THESL standard.

This project mainly addresses the conversion of KHF1 south of Sheppard Ave. The converted load will be transferred to feeders NT63M5 and NAE5-1M24. In order to convert the underground distribution of Rubic Crescent, this project needs to be completed. There are two for the conversion of Rubic Crescent underground distribution, and these two projects are dependent on the completion of this project in order to move forward. In addition, the project needs to be carried out to accommodate residential load creep as well as load increase from future emerging businesses in the area.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			287
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,092	50	1,450
Feeder CMO ***(Cumulative)***	58,276	11,000	2,900

Benefits

- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Reduces of maintenance costs by removing obsolete 4kV equipment
- Modernize the electrical distribution to present THESL standard.
- Targets to achieve better operational flexibility and more reliable supply.
- Improves of the safety of THESL crew workers and the public
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV

IMPACT OF DEFERRAL

Deferal of this project will delay the decommissioning of the MS where the switchgear and breaker have become obsolete. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in previous years in order to fully decommission Brimley Sheppard MS. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 27.6kV equipment.

Portfolio:	Overhead
Project Title:	CSP and Overhead Conductor Replacement
Project Number:	20965
Project Year:	2013
Estimate Cost:	$904,750

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild / replace the aging and/or non standard primary OH distribution equipment on feeder 85M1 in order to improve reliability. This project is one part of seven related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 145 poles and 50 non standard transformers as well as other non standard assets such as porcelain switches and arrestors. The rebuild boundaries for this project is Codsell Avenuie, Dresden Road, Faywood Boulevard, Findlay Boulevard, Gorman Park Road, Mcallister Road, Norcross Road, Reiner Road.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	CODSELL AVE.
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M1

JUSTIFICATION

Project Background

Feeder 85M1 has sustained eight interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators,

arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During the past three years, this feeder has experienced on average over 100,000 customer minutes out. During the past ten years, there have been over 50 overhead related outages on this feeder. Of these outages, 13 are attributed to transformers and 8 due to arrestor failure.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			169
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5596	178	341
Feeder CMO ***(Cumulative)***	181878	22483	110225

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio:	Overhead
Project Title:	Refurbish Overhead Feeder 85M23
Project Number:	21113
Project Year:	2013
Estimate Cost:	$954,382

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild / replace the aging and/or non standard primary OH distribution equipment on feeder 85M23 in order to improve reliability. This project is one part of seven related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 75 poles and 45 non standard transformers as well as other non standard assets such as porcelain switches and arrestors. The rebuild boundaries for this project is Old Orchard Grove, Kereven, Weetwood, Kelso, Bannockburn, Falkirk, Haddington and Clyde.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BATHURST ST.
STATION(S)	BATHURST II TS
FEEDER(S)	NY85M23

JUSTIFICATION

Project Background

Feeder 85M23 has sustained 13 interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During the past three years, this feeder has experienced on average over 500,000 customer minutes out. During the past ten years, there have been over 90 overhead related outages on this feeder. Of these outages, 42 are attributed to transformers, 16 attributed to animal contacts, and 11 attributed to tree contacts.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			80
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			13
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	50,166	4,105	166
Feeder CMO ***(Cumulative)***	1,304,100	287,995	49,215

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking,

fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Thorncrest (#011) Rear Lot Voltage Conversion (Electrical) Phase #6

Project Number: 21186

Project Year: 2013

Estimate Cost: $969,234

PROJECT DESCRIPTION

Objective:

This project is part of a program to upgrade the 4 kV distribution system to a higher voltage and removing the rear lot plant in the Thorncrest Village area. The purpose of this project in particular is to execute the fifth phase of the electrical potion of this on-going conversion that is bounded by Thornbury Cresecent, Kipling Avenue, Twyford Road, and Thorncrest Road.

Scope:

The scope of work for this project is to execute the electrical portion to convert approximately 160 customers fed from the rear lot to the front underground with low profile transformers. This electrical phase entails installing primary and secondary cabling from approximately 16 single-phase padmounted transformers and making secondary connection to customers via tap boxes. There are 8.0 km of seconday service conductor, 4.0 km of 1/0 TRXLPE 27.6 kV conductor, and all rear-lot poles, lines, transformers, and switches will be removed.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	THORNCREST RD.
STATION(S)	THORNTON MS
FEEDER(S)	ETRAF2

JUSTIFICATION

Project Background

The Thorncrest Village area is reaching the end of its servicable life and similar to other rear lot areas, there is difficulty in accessing and repairing these rear-lot fed equipment. There are also old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. This rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is one of the key driving force for implementing this work.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			215
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	221	484	16
Feeder CMO ***(Cumulative)***	58497	212743	1040

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability, improving outage duration.
- Enhances customer satisfaction as a result of Improves restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improves life-cycle costs
- Enhances safety and improves accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is to be deferred, lack of access will continue to present safety hazards to crews during emergency outage situations. Delays in rear lot renewal will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of MS.

Portfolio: Overhead

Project Title: Gosford/Milo Park Voltage Conversion & DB Cable Replacement

Project Number: 21721

Project Year: 2013

Estimate Cost: $951,715

PROJECT DESCRIPTION

Objective:

The purpose of this project is to convert feeders SS55F3 and SS55F1 fed by Jane MS from 4kV to 27.6kV. This project is one phase of a multi-phase program to convert the 4kV loads, with the final objective of decommissioning Jane MS. In addition, the purpose of this project is to improve reliability in the Gosford/Milo Park area by replacing poor performing assets.

Scope:

The scope of work for this project is to install 1920 m of 3/0 overhead conductor and 350 m of 1/0 underground primary conductor to extend the three-phase on Gosford Blvd and Milo Park. This project will also be addressing the replacement of 45 poles, 11 overhead single-phase transformers and three underground transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	GOSFORD/MILO PARK
STATION(S)	JANE MS
FEEDER(S)	NYSS55F3, NYSS55F1

JUSTIFICATION

Project Background

Jane MS was built in the 1950’s - 1960’s and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. As a result the overhead plant in this area in the vicinity of Gosford and Milo Park is approaching the end of its serviceable life. THESL has identified poor pole conditions, non-standard equipment and insulators. To improve the reliability of the customers in the area, this project will convert the system from 4.16 kV to 27.6 kV. Voltage upgrades sufficiently reduce system losses and the overall life-cycle cost. The voltage conversion is considered to be economical because the feeders are in need of a complete rebuild.

The electrical industry is moving away from 4kV equipment, therefore spare parts for these assets are very costly and difficult to attain. This will result in a further increase in outages and more lengthy outages due to lack of readily available spare parts as well as Increased cost for reactive replacements.

To improve the reliability for the customers in the area, it is proposed to replace the primary direct buried, transformers and upgrade voltage from13.8kV to 27.6kV which will also reduce distribution losses in the system. The underground primary direct buried cable feeding to T8346 and T8347 have experience of numerous faults since 2008

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			367
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			2, 4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2468	338	105
Feeder CMO ***(Cumulative)***	166206	39910	22611

Benefits

- Reduces maintenance costs by removing obsolete 4kV equipment
- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Modernizes local distribution system by replacing hardware on the aging distribution system
- Eliminates electrical and safety hazards by replacing assets in poor conditions
- Reduces the probability of outages due to electrical water-tree tracking by replacing glass arrestors, insulators and fuses

IMPACT OF DEFERRAL

Project deferral will result in continued high station maintenance costs. THESL would also endure higher maintenance costs associated with other existing obsolete non-standard 4kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program in order to fully decommission Jane.

Portfolio: Overhead

Project Title: Weston Railway Overhead Rebuild

Project Number: 22040

Project Year: 2013

Estimate Cost: $ 991,265

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild / replace the aging and/or non standard primary overhead distribution equipment and replace the XLPE lateral services with tree retardant cable to improve reliability. This project is one part of four related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 95 poles and 31 non standard transformers as well as other non standard assets such as porcelain switches and arrestors. In addition, the existing 3-556 kcmil trunk portion of the primary lines is to be replaced with 1 – #3/0 fused primary lines. The rebuild boundaries for this project is Wilson Avenue, Weston Railway, Weston Road, Aura Lea Road.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WESTON RAILWAY - OH REBUILD
STATION(S)	FINCH II TS
FEEDER(S)	NY55M21

JUSTIFICATION

Project Background

Feeder 55M21 has sustained three interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During the past three years, this feeder has consistently experienced over 40,000 customer minutes out.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			247
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,297	844	1,254
Feeder CMO ***(Cumulative)***	60,313	45,176	42,972

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions
- Reduces the number of high-impact feeder exposures

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation. Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Refurbish Feeder Laterals – Feeder 85M10

Project Number: 22208

Project Year: 2013

Estimate Cost: $986,870

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild and/or replace the aging and/or non standard primary overhead distribution equipment on feeder 85M10 in order to improve reliability and replace the XLPE lateral services with tree retardant cable to improve reliability. This project is one part of three related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 100 poles, and 30 non-standard transformers. Also, poor performing assets such as non-standard glass insulators and arrestors will be replaced as well. In addition, undersized primary overhead conductor will be replaced to standard size. In areas where underground laterals are serviced with early vintage XLPE cable, it will be replaced with standard tree retardant cable. The boundaries of this project are Beffort, Murray, Powell, and Regent.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DOWNSVIEW-RODING-CFB
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M10

JUSTIFICATION

Project Background

Feeder 85M10 has sustained four interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose serious public safety hazard. During 2008 this feeder has experienced almost 2,000,000 customer minutes out. Over the past ten years, this feeder experienced over 50 overhead related outages of which 20 of these were transformer related.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			213
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,047	2,010	87
Feeder CMO ***(Cumulative)***	1,728,172	69,273	17,872

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents

- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Load Transfer (3MVA) A200E to New 13.8kV Feeder

Project Number: 21935

Project Year: 2013

Estimate Cost: $ 995,334

PROJECT DESCRIPTION

Objective:

The purpose of this project is to transfer 3MVA of load from feeder A200E to a new feeder off Carlaw TS A10-11E bus in order to relieve the overloaded feeder A200E.

Scope:

The scope of work on this project is to install new cabling underground on the new feeder's circuit breaker on bus A10-11E at Carlaw TS and then run it along Dundas St and north on Greenwood Ave to the area serviced by feeders B3HW and B5HW (now 13.8kV feeders, fed from feeder A200E). The load from those two feeders will be transferred to a new feeder. The project area is bounded by Danforth Avenue in the north, Greenwood Avenue in the east, Gerrard Street in the south, and Carlaw Avenue in the west.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	RIVERDALE
STATION(S)	CARLAW MS
FEEDER(S)	B3HW, B5HW

JUSTIFICATION

Project Background

THESL intends to transfer 3MVA load from feeders B3HW and B5HW to feeder A200E in order to decommission Hazelwood MS. As a consequence of the load transfer, feeder A200E will be loaded to approximately 9MVA will be near full capacity. The purpose of this project is to relieve some of this consequent load on A200E and transfer about 3MVA to the new feeder off Carlaw TS which will allow the area serviced by A200E to have a full 1st contingency backup in the event of an outage.

Benefits

- Provides a full 1st contingency plan in the event of an outage on A200E, by reducing A200E's load to a level that can be supplied by backup feeders in the area
- Provides additional capacity for load growth in the area, as well as support future Overhead conversion projects

IMPACT OF DEFERRAL

Deferring the load transfer from feeder A200E will leave customers supplied by this feeder in a vulnerable position in the event of an outage, as the backup feeder to A200E cannot accommodate an additional 9MVA of load. If the installation of the new feeder is delayed, future planned box construction conversion projects will be delayed as well.

Portfolio:	Overhead
Project Title:	NY80M4 Overhead Rebuild (Wires, Transformers, Insulators, Poles)
Project Number:	21193
Project Year:	2013
Estimate Cost:	$ 851,574

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, glass insulators, arrestors and rebuild end of life assets on feeder 80M4 in order to improve reliability. This project is one part of five related projects to rehabilitate this feeder.

Scope:

The scope of work for this project includes an replacement of about 45 spans of 3/0 overhead conductor, 39 and 100 poles. Work will span the areas: Cummer Avenue, Doverwood Court, Drewry Avenue, Everingham Court, Fairchild Avenue, Maxome Avenue, Mullet Road, Northwood Drive, Pheasant Road, Silverview Drive, Tobruk Crescent, Urbandale Avenue, Wedgewood Drive and Willowdale Avenue.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	YONGE STREET
STATION(S)	FAIRCHILD I TS
FEEDER(S)	NY80M4

JUSTIFICATION

Project Background

Feeder 80M4 has sustained 11 interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a 8 serious public safety hazard. During the past ten years, this feeder has sustained 30 outages due to overhead defective equipment. Furthermore, during 2010 this feeder experienced over 400,000 customer minutes out and almost 7,000 customer interruptions. This has resulted in a feeder rank of 26th in the worst performing feeder list.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			26
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			11
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	616	1,948	6,980
Feeder CMO ***(Cumulative)***	67,047	50,189	402,591

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents

- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Rear Lot #011 Phase #2 Electrical Voltage Conversion

Project Number: 20808

Project Year: 2013

Estimate Cost: $873,815

PROJECT DESCRIPTION

Objective:

The purpose of this project is to build electrical equipment to convert rear lot distribution to front lot underground in the area bounded by Princess Margaret Boulevard, Rathburn Road, Islington Avenue and Kipling Avenue. More specifically, this project is the second phase of electrical work in the area bounded by this project.

Scope:

The scope of this project entails installing TRXLPE cable primary risers for a single-phase primary loop that will be connected to the white phase of 88M13. In summary, eight single-phase pad foundations, 32 tap boxes, 4,300m of service cable, and 1,600m of primary cable will be installed. Thereafter, all poles, lines, transformers and switches in the rear lot associated with this conversion will be removed.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	PRINCESS MARGARET BLVD
STATION(S)	LONGFIELD, RAVENSBOURNE
FEEDER(S)	ETBHF2, ETABF3

JUSTIFICATION

Project Background

The area bounded by this project is reaching the end of its servicable life and similar to other rear lot areas, there is difficulty in accessing and repairing these rear-lot fed equipment. There are also old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. This rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is one of the key driving force for implementing this work.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			425
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			1, 3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	857	618	528
Feeder CMO ***(Cumulative)***	31,769	29,563	82,068

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability, improving outage duration.
- Enhances customer satisfaction as a result of Improves restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improves life-cycle costs
- Enhances safety and improves accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is to be deferred, the lack of access to crews during emergency outage situations will continue. Delays in rear lot renewal will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of MS.

Portfolio: Overhead

Project Title: Clayson/Bartor Trunk Feeder Reconfiguration & Refurbishment

Project Number: 21999

Project Year: 2013

Estimate Cost: $ 888,519

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild and/or replace the aging and/or non standard primary overhead distribution equipment and replace the XLPE lateral services with tree retardant cable to improve reliability. This project is one part of four related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to install primary overhead lines at several locations along feeder 55M21 as well as replacing approximately 25 end-of-life poles. Replacement of all XLPE primary service laterals with TRXLPE cable from the overhead system to the transformer vault/pad/sub will also be part of this scope. The boundaries of this project are Clayson Rd, Bartor Rd, Huxley Rd and Highbury Rd

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	CLAYSON-BARTOR
STATION(S)	FINCH II TS
FEEDER(S)	NY55M21

JUSTIFICATION

Project Background

Feeder 55M21 has sustained three interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During the past three years, this feeder has consistently experienced over 40,000 customer minutes out.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			247
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,297	844	1,254
Feeder CMO ***(Cumulative)***	60,313	45,176	42,972

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking,

fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. The deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio:	Overhead
Project Title:	CSP Replacements NYSS58F1
Project Number:	20370
Project Year:	2013
Estimate Cost:	$883,352

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, glass insulators, arrestors on feeder SS58F1 in order to improve reliability.

Scope:

The scope of work for this project is to replace 61 non-standard CSP transformers and spot replacement of poles. The boundaries for this project are Derrydowns and Grandravine.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	DERRYDOWNS RD
STATION(S)	SENTINEL MS
FEEDER(S)	NYSS58F1

JUSTIFICATION

Project Background

Feeder 58F1 has sustained four interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. During the past ten years, this feeder has sustained 25 outages due to overhead related causes. Over the past three years, this feeder has averaged over 80,000 customer minutes out.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			186
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	678	460	1,229
Feeder CMO ***(Cumulative)***	129,111	77,715	70,535

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio:	Overhead
Project Title:	CSP Replacement & Tree Proof Cable Installation
Project Number:	19775
Project Year:	2013
Estimate Cost:	$ 800,276

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, glass insulators, arrestors and rebuild feeder 34M6 overhead primary distribution with tree proof conductor in order to improve reliability.

Scope:

The scope of work for this project is to replace 50 poles and 30 CSP transformers, as well as glass insulators and arrestors. The boundaries for this project are Mount Pleasant Road, The Donway, York Mills Road, and Eglinton Avenue.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	LEASIDE
STATION(S)	LEASIDE TS
FEEDER(S)	NY34M6

JUSTIFICATION

Project Background

Feeder 34M6 has sustained three interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. During the past ten years, this feeder has sustained 24 outages due to overhead related causes.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			102
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	661	2,721	5,291
Feeder CMO ***(Cumulative)***	49,160	222,654	118,225

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Feeder Rehab SCNAR43M30

Project Number: 22178

Project Year: 2013

Estimate Cost: $ 821,785

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the non-standard, aged and poor condition overhead distribution assets to improve the stability of this feeder. This project is one part of three related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace 151 poles as well as non standard assets such as glass insulators and arrestors. The boundaries for this project are Neilson Road, Kingston Road, St. Clair Avenue and Sloley Road.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	ST. CLAIR & MIDLAND
STATION(S)	WARDEN TS
FEEDER(S)	SCNAR43M30

JUSTIFICATION

Project Background

Feeder 43M30 has sustained five interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			48
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4,875	50	152
Feeder CMO ***(Cumulative)***	19,522	6,582	21,394

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Thorncrest (#011) Rear Lot Voltage Conversion Phase #3 (Civil/Electrical)

Project Number: 21211

Project Year: 2013

Estimate Cost: $742,784

PROJECT DESCRIPTION

Objective:

This project is part of a program to upgrade the 4 kV distribution system to a higher voltage and removing the rear lot plant in the Thorncrest Village area. The purpose of this project in particular is to extend 88M13 and convert 4 kV customers to front lot 27.6 kV.

Scope:

This project entails upgrading 88M13 along Rathburn Road and Islington Avenue from 1/0 to 556kcmil cable. It requires the extension of 88M13 along Rathburn Road to Kipling Avenue and just north on Kipling for future expansion, while maintaining the 4 kV underbuild. All poles, lines, transformers and switches associated with this conversion will be removed and recovered. In summary, 33 new poles, 32 spans of 556kcmil overhead conductor, 32 spans of bundle secondary, and 4 padmounted transformers with secondary services will be installed.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	THORNCREST
STATION(S)	RICHVIEW
FEEDER(S)	ET88M13

JUSTIFICATION

Project Background

The Thorncrest Village area is reaching the end of its servicable life and similar to other rear lot areas, there is difficulty in accessing and repairing these rear-lot fed equipment. There are also old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. This rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is one of the key driving force for implementing this work.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			40
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	8,614	10,822	13,822
Feeder CMO ***(Cumulative)***	37,220	92,019	27,902

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability due to converting rear-lot fed areas and in turn, improving outage duration. Furthermore, replacing aging 4.16 kV infrastructure, as well as station circuit breakers and switchgear, also contributes to Improves reliability.
- Enhances customer satisfaction as a result of Improves restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improves life-cycle costs that are attributed to the 27.6 kV distribution system as opposed to a 4 kV system.

- Enhances safety and improves accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is to be deferred, the lack of access to crews during emergency outage situations will continue. Delays in rear lot renewal will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of the MS.

Portfolio: Overhead

Project Title: CSP and Insulator Replacement (YK11M5) Phase #2

Project Number: 20385

Project Year: 2013

Estimate Cost: $799,997

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the non-standard, aged and poor condition overhead distribution assets to improve the stability of feeder 11M5. This project is one part of two related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to replace approximately 60 CSP transformers as well as glass insulators and arrestors. Also, due to end-of-life conditions, spot replacement of poles will also be undertaken. The boundaries of the project are Runymede Avenue, Waston Avenue, Corbett Avenue and Annette Street.

DISTRICT	YORK
DISTRICT NEIGHBOURHOOD	RUNNYMEDE
STATION(S)	RUNNYMEDE TS
FEEDER(S)	YK11M5

JUSTIFICATION

Project Background

Feeder 11M5 has sustained eight interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators,

arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. Over the past three years this feeder experienced an average of over 300,000 customer minutes out and over 7,000 customer interruptions. As a result, this feeder is ranked 9th on the worst performing feeder list.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			9
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,520	6,084	14,210
Feeder CMO ***(Cumulative)***	142,160	466,604	423,523

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: NY55M25 Overhead Feeder Equipment Rehab

Project Number: 20412

Project Year: 2013

Estimate Cost: $ 716,308

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the non-standard, aged and bad condition overhead distribution assets to improve the stability of feeder 55M25. This project is one part of twelve related projects to rehabilitate this feeder.

Scope:

The scope of work for this project is to install approximately 30 poles and replace 50 CSP transformers as well as glass insulators and arrestors. The boundaries of this scope are Oakdale Road, Sheppard Avenue, and Giltspur Drive.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	SHEPPARD-OAKDALE
STATION(S)	FINCH II TS
FEEDER(S)	NY55M25

JUSTIFICATION

Project Background

Feeder 55M25 has sustained eight interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators,

arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. Over the past three years this feeder experienced an average of over 120,000 customer minutes out and over 1,500 customer interruptions.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			100
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	311	3,828	306
Feeder CMO ***(Cumulative)***	29,119	283,018	42,326

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio:	Overhead
Project Title:	Overhead Rehab SCREF3
Project Number:	22229
Project Year:	2013
Estimate Cost:	$ 677,325

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard assets that have reached the end of their serviceable life and thus, improve the stability of this feeder.

Scope:

The scope of this project is to address overhead outages by replacing non-standard or poor condition assets and adding animal guards. This will improve the reliability of supply to customers and bring the distribution to the latest standard. Work includes the replacement of poles at 132 locations, 357 porcelain insulators at 191 locations, 57 animal guards and bare drop wire, and the installation of ground wire U-guards at 15 locations.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SHEPPARD & BIRCHMOUNT
STATION(S)	SHEPPARD KENNEDY
FEEDER(S)	SCREF3

JUSTIFICATION

Project Background

This feeder experienced 4 outages in the past year. The recent feeder patrol on SCREF3 identified a number of areas which require attention. Feeder patrols identified poles which are in poor condition and with non-standard porcelain insulators, animal guards, bare transformer drop wires and aged porcelain switches that should conform to THESL's current construction standards.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			173
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,215	823	439
Feeder CMO ***(Cumulative)***	87,490	83,159	21,478

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

**IMPACT OF DEFERRAL **

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Voltage Conversion KHF2 SCKHF2

Project Number: 20774

Project Year: 2013

Estimate Cost: $ 663,387

PROJECT DESCRIPTION

Objective:

The objective of this project is to convert loads of feeder KHF2 fed by Brimley Sheppard MS from 13.8kV to 27.6kV. This project is one phase of a multi-phase program to convert the entire 13.8kV load at Brimley Sheppard MS, with the final objective of decommissioning Brimley Sheppard MS.

Scope:

The scope of this project involves voltage conversion of existing 13.8kV feeder KHF2 to 27.6kV. Work will involve removing all existing 13.8kV primary transformers, switches and replace with 27.6kV primary equipments. New primary line will need to be installed and 13.8kV line removed.

DISTRICT	Scarborough
DISTRICT NEIGHBOURHOOD	Sheppard Avenue East & McCowan Road
STATION(S)	Brimley Sheppard(13.8 kV)
FEEDER(S)	SCKHF2

JUSTIFICATION

Project Background

Brimley Sheppard MS was originally built in 1965 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. The station was built with PILC cables during the time around construction of the station. Both transformer and 13.8kV breakers are very old. The 13.8kv distribution system is also old. These were several failures on the primary cables installed direct buried. The oil circuit breakers have reached their end of life. There are PILC cables on both sides (27.6 and 13.8kV) of the transformer.

To reduce the maintenance cost from the station and distribution equipment and to modernize the electrical distribution, THESL will convert the distribution fed from this MS with the latest 27.6kV assets and with THESL standard.

In addition, the project needs to be carried out to accommodate residential load creep as well as load increase from future emerging businesses in the area.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			472
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	60	0	0
Feeder CMO ***(Cumulative)***	23,100	0	0

Benefits

- Improves the safety of THESL crew workers and the public
- Reduction of maintenance costs
- Lower risk of failures due to the replacement of 13.8kV assets past useful life with existing

standard 27.6kV equipment

- Increases capacity with 27.6kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Improvement in the aesthetics of the street
- Reduction of system losses when 13.8kV is upgraded to 27.6kV
- Eliminates the need of maintaining station power transformer and obsolete switchgear and an old 13.8kv distribution.
- Modernizes the distribution by converting the old feeder to standard 27.6kV distribution system.
- Helps the removal of overhead lines crossing Sheppard to facilitate construction of future LRT corridor.

IMPACT OF DEFERRAL

Defferal of this project will delay the decommissioning of the MSs whose switchgear and breaker have become obsolete. This will also delay the completion of a series of projects of Brimley Sheppard. THESL would also endure higher maintenance costs associated with the existing obsolete non-standard 13.8kV equipment as compared to standard overhead 27.6kV equipment.

Portfolio:	Overhead
Project Title:	Refurbish Overhead Feeder 85M23 Phase #4
Project Number:	21123
Project Year:	2013
Estimate Cost:	$628,452

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the non-standard, aged and bad condition overhead distribution assets to improve the stability of feeder 85M23. This project is one part of seven related projects to rehabilitate this feeder.

Scope:

The scope of this project is to replace of CSP transformers at 32 locations and poles at 75 locations along the 6 streets (Cranbrooke, Woburn, Bedford Park, Douglas, Glenganry and Avenue). Non-standard or deteriorated hardware at the pole and transformer locations including, glass or porcelain insulators, porcelain arrestors, etc. are proposed to be replaced.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BATHURST
STATION(S)	BATHURST II TS
FEEDER(S)	NY85M23

JUSTIFICATION

Project Background

Feeder 85M23 has sustained thirteen interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. Over the past three years this feeder experienced an average of over 500,000 customer minutes out and over 18,000 customer interruptions. Over the past ten years, this feeder has experienced 91 overhead related outages. Of these, 42 were attributed to transformer related causes.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			80
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			13
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	50166	4105	166
Feeder CMO ***(Cumulative)***	1304100	287995	49215

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents

- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio:	Overhead
Project Title:	Elynhill, Ellerslie, Betty Ann, and Park Home OH Rebuild Phase #2
Project Number:	22180
Project Year:	2013
Estimate Cost:	$650,636

PROJECT DESCRIPTION

Objective:

The purpose of this project is to improve and refurbish power supply reliability by rehabilitating aging distribution infrastructure on feeder NY80M1.

Scope:

The scope of this project requires that end-of-life and non-standard assets be replaced. Within the boundaries of this project, all overhead primary conductors, end-of-life poles and CSP transformers will be replaced with current standard equipment. During the rebuild of the area, it is proposed to rebuild all non-standard assets as well. In summary, 65 poles and 21 transformers will be replaced. The boundaries of this project are Senlac Road, Alonzo Road, Elynhill Drive and Park Home Avenue.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	ELYNHILL DR.
STATION(S)	FAIRCHILD I TS
FEEDER(S)	NY80M1

JUSTIFICATION

Project Background

Feeder 80M1 has sustained 15 outages during the past year and is ranked 30th on the WPF list. Most of the assets on the laterals have approached end-of-life and are non-standard. The feeder has numerous non-standard porcelain insulators, porcelain switches and many poles are deteriorating. Also, installation of animal guards is required. Animal contact is one of the biggest contributors to outages in this area and thus, the installation of animal guards is required. All existing switches and arrester brackets that are steel need replacement as per current standards, as well as porcelain lightning arrestors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			30
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			15
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1083	3983	4341
Feeder CMO ***(Cumulative)***	133234	151817	140091

Benefits

- Reduces the probability of outages due to electrical water-tree tracking by replacing porcelain arrestors, insulators and fuses
- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Reduces outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such

as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. The deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Furthermore, the feeder will be exposed to increased outages due to animal and tree interference.

Portfolio:	Overhead
Project Title:	Rebuild Windfield MS Area with Voltage Conversion 51M21
Project Number:	20260
Project Year:	2013
Estimate Cost:	$ 639,589

PROJECT DESCRIPTION

Objective:

The objective of this project is to convert 4kV feeders fed by Windfield (SS27) MS from 4kV to 27.6kV system. The final objective of this project is to decommission Windfield MS.

Scope:

This project includes building new overhead 27.6kV lines on these streets the following streets: Wilket Rd, Wyengate Crt, Tudor Gate, Harrison Rd, Sulgrave Cres, Colverstone Rd, Rollscourt Dr, Bachelor Pl, Bayview Avenue and York Mills Rd. Convert all primary distribution with overhead using ASC 556kcmil for the three-phase feeder mains and 3/0 ACSR for fused spurs/radials. Use 140k fuse for the first lateral and 100k or less (based on the connected transformer/load) for the second lateral, if any. Replace all the transformers with 27.6/16 kV units and keeping existing secondary as per the present THESL standards. Dismantle and remove all the single and three-phase laterals, leaving only the 4kV feeder mains for now until all conversions of the four MSs (SS21, SS27, SS37, SS46) are complete.

DISTRICT	North York
DISTRICT NEIGHBOURHOOD	Bayview Avenue & York Mills Road
STATION(S)	Windfield MS(4.16 kV)
FEEDER(S)	NYSS27F1,NYSS27F2,NYSS27F3

JUSTIFICATION

Project Background

Winfield MS station was originally built in mid-sixties and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. The existing 4kV feeders are overhead design and are difficult to maintain, as they are an obsolete distribution standard. There are currently a high number of assets past their useful life on these feeders, and needs to be addressed. Currently three MS stations supply an isolated 4kV distribution. A few voltage conversion (including rear lot) projects have been planned after the serious overloading in a contingency situation in early 2008. To reduce the maintenance cost on the station and distribution equipment and to modernize the electrical distribution, THESL proposes to convert the isolated 4kV distribution area with the latest 27.6kV assets and with THESL standard.

In addition, the project needs to be carried out to accommodate residential load creep as well as load increase from future emerging businesses in the area. Feeder NY51M21 will supply most of the load for this project.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			5
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			19
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,939	15,060	9,953
Feeder CMO ***(Cumulative)***	117,650	2,280,363	399,449

Benefits

- Modernizes by replacing 45 year old 4kV distribution system with 27.6kV

- Reduces maintenance costs by removing obsolete 4kV equipment
- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Increases capacity with 27.6kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces of system losses when 4kV is upgraded to 27.6V
- Reconfigures the distribution for the latest THESL standard for operation and protection
- Reduces the overloading on the existing and remaining 4kV feeders
- Paves the way for decommissioning the MS station whose switchgear and breakers have become obsolete
- Targets to achieve better operational flexibility and more reliable supply

IMPACT OF DEFERRAL

Deferral may bring this project in conflict with projects from other utilities or the newly imposed city moratorium. Potential overloading situation will continue to exist. Defferal will delay the decommissioning of the MS where the switchgear and breaker have become obsolete. THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to the standard overhead 27.6kV equipment.

Portfolio:	Overhead
Project Title:	Rebuild Area of MS EA and GB with Voltage Conversion
Project Number:	19911
Project Year:	2013
Estimate Cost:	$ 576,290

PROJECT DESCRIPTION

Objective:

The purpose of this project is to convert existing 4kV feeders from Comstock Faulklands (EA) and Civic Sinnott (GB) station to 27.6kV system. This project is to completely is to convert the loads from these two stations with the final objective to decomission the station.

Scope:

The scope of the project is to convert all primary distribution with overhead using ASC 556kcmil for the three-phase feeder mains and 3/0 ACSR for fused spurs/radials. Use 140k fuse for the first lateral and 100k or less (based on the connected transformer/load) for the second lateral, if any.For the underground install 1/0 Al TRXLPE in concrete encased ducts.Replace all the transformers with 27.6/16.0kV units, and keeping existing secondaries. The feeders involved are: EA-F1, EA-F2, EA-F3, TJ-F1, TJ-F3, GB-F1, GB-F2, GB-F3 and WA-F2 from Comstock Faulklands MS, Birchmount Ashtonbee MS, Civic Sinnott MS and Craigton Pharmacy MS. At the end of the project dismantle and remove all 4kV assets from the area bounded by south side of Hydro One ROW, west side of Birchmount Road.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	EGLINTON & WARDEN
STATION(S)	COMSTOCK FAULKLANDS MS & CIVIC SINNOTT MS

FEEDER(S)	SCEAF1, SCEAF2, SCEAF3, GBF1, GBF2, GBF3, TJF3

JUSTIFICATION

Project Background

Comstock Faulklands (EA) and Civic Sinnott (GB) were built in 1952 and 1956 respectively as outdoor type stations. Transformers and oil breakers there are very old. The 4kV distribution system supplying the area is also old. To reduce the maintenance cost from the station and distribution equipment and to modernize the electrical distribution, THESL proposes to convert the area with the latest 27.6kV assets and with THESL standard.

The conversion of distribution of the area supplied by Comstock Faulklands (EA) and Civic Sinnott (GB) and part of Birchmount Ashtonbee TJ-F3 west of Birchmount Road, will allow the removal of all 4kV lines south of Hydro One ROW and west of Birchmount.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			306
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	0	56	0
Feeder CMO ***(Cumulative)***	0	1,624	0

Benefits

- Lowers the risk of failures due to the replacement of approximately 55 years worth of 4kV assets with existing standard 27.6kV equipment

- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 27.6kV feeders to accommodate load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 27.6kV
- Reconfigures the distribution for the latest THESL standard for operation and protection.

IMPACT OF DEFERRAL

Deferral may bring this project in conflict with projects from other utilities or the newly imposed city moratorium. THESL would also endure higher maintenance costs associated with existing, obsolete non-standard 4kV equipment when compared to standard overhead 27.6kV equipment. Lastly, if this work was to be deferred, there is a higher risk of failure due to the number of assets past useful life.

Portfolio:	Overhead
Project Title:	Refurbish Overhead Feeder 85M23 Phase #2 of 4
Project Number:	21118
Project Year:	2013
Estimate Cost:	$570,313

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the non-standard, aged and poor condition overhead distribution assets to improve the stability of feeder 85M23. This project is one part of seven related projects to rehabilitate this feeder.

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Scope:

The scope of work for this project requests the installation of 65 spans of tree-proof #3/0 ACSR conductors along five streets (Kelso Avenue, Clyde Avenue, Carmichael Avenue, Joicey Boulevard and Dunblaine Avenue). Replacement of CSP transformers at 31 locations and poles at 42 locations will also be executed as part of this project.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BATHURST
STATION(S)	BATHURST II TS
FEEDER(S)	NY85M23

JUSTIFICATION

Project Background

Feeder 85M23 has sustained thirteen interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. Over the past three years this feeder experienced an average of over 500,000 customer minutes out and over 18,000 customer interruptions. Over the past ten years, this feeder has experienced 91 overhead related outages. Of these, 42 were attributed to transformer related causes.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			80
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			13
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	50,166	4,105	166
Feeder CMO ***(Cumulative)***	1,304,100	287,995	49,215

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)

- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Refurbish Overhead Feeder 85M23 Phase #3 of 4

Project Number: 21122

Project Year: 2013

Estimate Cost: $585,731

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the non-standard, aged and poor condition overhead distribution assets to improve the stability of feeder 85M23. This project is one part of seven related projects to rehabilitate this feeder.

Scope:

The scope of this project is to replace 44 spans of tree-proof # 3/0 ACSR conductors along the feeder's overhead line on 4 streets (Deloraine Avenue, Ledbury Street, Grey Road and Brookdale Avenue) along with replacement of CSP transformers and poles at 32 locations will be done as part of this project. New telcon drop wire with a cone installed over the primary bushing will be installed on the new transformers. Non-standard or deteriorated hardware at the pole and transformer locations including, but not limited to poles, glass or porcelain insulators and porcelain arrestors to be replaced by new units that conform to the latest THESL standards.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BATHURST
STATION(S)	BATHURST II TS
FEEDER(S)	NY85M23

JUSTIFICATION

Project Background

Feeder 85M23 has sustained thirteen interruptions during the past year. The area is primarily comprised of non-standard poor performing assets such as CSP transformers, glass insulators, arrestors, and switches. As obsolete equipment, such as porcelain insulators and arrestors, ages it becomes more contaminated. As such, efforts are required to replace these assets in order to improve reliability. Furthermore, spot pole replacement is required. Aging poles with reduced strength not only impact reliability, but can also pose a serious public safety hazard. Over the past three years this feeder experienced an average of over 500,000 customer minutes out and over 18,000 customer interruptions. Over the past ten years, this feeder has experienced 91 overhead related outages. Of these, 42 were attributed to transformer related causes.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			80
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			13
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	50,166	4,105	166
Feeder CMO ***(Cumulative)***	1,304,100	287,995	49,215

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years

- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Feeder Rehab and CSP Changeout Phase #1

Project Number: 21517

Project Year: 2013

Estimate Cost: $574,064

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace non-standard CSP transformers, poles, conductors, glass insulators and arrestors on 80M8.

Scope:

The scope of this project entails replacing CSP transformers at 14 locations and poles at 45 locations along the streets of Bathurst Street, Transwell Avenue, Peckford Road, Robson Place, Kenton Drive, Dallas Road, Lister Drive, Pennard Court, and Dornfell Street. New drop wires with cones are to be installed over the primary bushing of the new transformers. Non-standard or deteriorated hardware at pole and transformer locations including, but not limited to poles, glass or porcelain insulators, and porcelain arrestors are to be replaced by new units that conform to the latest THESL standards. In summary, 45 poles and 15 transformers are to be replaced. All redundant poles, lines, transformers and switches associated with this work are to be removed.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BATHURST
STATION(S)	FAIRCHILD I TS
FEEDER(S)	NY80M8

JUSTIFICATION

Project Background

The Feeders Experiencing Sustained Interruptions (FESI) program, which began back in 2007, examines particular feeders that have had seven interruptions or more. Interruptions are measured as part of a rolling frequency, from month to month. 80M8, in particular, had 7 animal contact and 5 overhead transformer outages in the past 10 years.

Feeder improvement desisions are primarily based upon asset centric replacements. Poles are replaced based on health index, as well as feild crew and engineer visual inspections. Also, non-standard assets such as CSP transformers, glass insulators, arrestors and switches will be replaced due to their historical poor reliability. Animal guards will be installed at all transormer locations in order to prevent animal contact where no guards presently exists. Also, the non-standard animal guards will also be replaced due to their poor historical performance. In addition, all overloaded transformers will be replaced due to increased probability of faliure caused by stress on the transformers. Also, where the primary lines are in close proximity to trees, tree-proof conductor will be installed in order to reduce outage probability.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			82
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	4,010	4,622	4,616
Feeder CMO ***(Cumulative)***	60,163	308,615	226,098

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference

- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the pole tops, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, customer satisfaction would also be negatively impacted if this project were deferred due to excessive overhead related outages on this feeder.

Portfolio: Overhead

Project Title: Thorncrest (#011) Rear Lot Voltage Conversion Civil/Electrical Phase #4

Project Number: 21213

Project Year: 2013

Estimate Cost: $509,560

PROJECT DESCRIPTION

Objective:

This project is part of a program to upgrade the 4 kV distribution system to 27.6kV and removing the rear lot plant in the Thorncrest Village area. The purpose of this project in particular is to extend OH 88M13 at Kipling Avenue and Rathburn Road north to Princess Margaret Boulevard.

Scope:

The project scope entails upgrading extending 88M13 at Rathburn Road and Kipling Avenue, north to Princess Margaret Boulevard with 556kcmil while maintaing the 4 kV underbuild. All customers fed from 4 kV on Kipling Avenue, between Rathburn Road and Princess Margaret Boulevard will be converted to 27.6 kV. Finally, all poles, lines, transformers and switches associated with this conversion will be removed and recovered. In summary, 39 new poles, 38 spans of 556kcmil overhead conductor, 37 spans of bundle secondary, and seven single-phase transformers will be installed.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	THORNCREST RD.
STATION(S)	RICHVIEW
FEEDER(S)	ET88M13

JUSTIFICATION

Project Background

The Thorncrest Village area is reaching the end of its servicable life and similar to other rear lot areas, there is difficulty in accessing and repairing these rear-lot fed equipment. There are also old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. This rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is one of the key driving force for implementing this work.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			40
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	8,614	10,822	13,822
Feeder CMO ***(Cumulative)***	37,220	92,019	27,902

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability due to converting rear-lot fed areas and in turn, improving outage duration.
- Enhances customer satisfaction as a result of Improves restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment

- Improves life-cycle costs
- Enhances safety and improves accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is to be deferred, the lack of access to crews during emergency outage situations will continue. Delays with rear lot renewal will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of the MS.

Portfolio: Overhead

Project Title: 80M1 Carney Rd Distribution Rehab

Project Number: 21920

Project Year: 2013

Estimate Cost: $569,706

PROJECT DESCRIPTION

Objective:

The purpose of this project is to improve the distribution system reliability by rehabilitating aging distribution infrastructure on feeder NY80M1.

Scope:

The scope of this project consists of the replacement of end-of-life and non-standard assets. Within the boundaries of this project, all overhead primary conductors, end-of-life poles and CSP transformers will be replaced with current standard equipment. During the rebuild of the area, it is proposed to rebuild all non-standard assets as well. In summary, 50 poles and 25 transformers will be replaced. The boundaries of this project are Carney Road, Blake Avenue, and Finch Avenue.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	CARNEY RD.
STATION(S)	FAIRCHILD I TS
FEEDER(S)	NY80M1

JUSTIFICATION

Project Background

Feeder 80M1 has sustained 15 outages during the past year and is ranked 30th on the WPF list. Most of the assets on the laterals have approached end-of-life and are non-standard. The feeder has numerous non-standard porcelain insulators, porcelain switches and many poles are deteriorating. Also, installation of animal guards is required. Animal contact is one of the biggest contributors to outages in this area and thus, the installation of animal guards is required. All existing switches and arrester brackets that are steel need replacement as per current standards, as well as porcelain lightning arrestors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			30
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			15
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,083	3,983	4,341
Feeder CMO ***(Cumulative)***	133,234	151,817	140,091

Benefits

- Reduces the probability of outages due to electrical water-tree tracking by replacing porcelain arrestors, insulators and fuses
- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Reduces outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such

as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. The deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Furthermore, the feeder will be exposed to increased outages due to animal and tree interference.

Portfolio: Overhead

Project Title: 80M1 Clarkhill Glenborough Park Ancona Overhead Rebuild

Project Number: 21998

Project Year: 2013

Estimate Cost: $521,385

PROJECT DESCRIPTION

Objective:

The purpose of this project is to improve distribution system reliability by rehabilitating aging distribution infrastructure on feeder NY80M1.

Scope:

The scope of this project requires that end-of-life and non-standard assets be replaced. Within the boundaries of this project, all overhead primary conductors, end-of-life poles and CSP transformers will be replaced with current standard equipment. During the rebuild of the area, it is proposed to rebuild all non-standard assets as well. In summary, 75 poles and 16 transformers will be replaced.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	GLENBOROUGH PARK
STATION(S)	FAIRCHILD I TS
FEEDER(S)	NY80M1

JUSTIFICATION

Project Background

Feeder 80M1 has sustained 15 outages during the past year and is ranked 30th on the WPF list. Most of the assets on the laterals have approached end-of-life and are non-standard. The feeder has numerous non-standard porcelain insulators, porcelain switches and many poles are deteriorating. Also, installation of animal guards is required. Animal contact is one of the biggest contributors to outages in this area and thus, the installation of animal guards is required. All existing switches and arrester brackets that are steel need replacement as per current standards, as well as porcelain lightning arrestors.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			30
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			15
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,083	3,983	4,341
Feeder CMO ***(Cumulative)***	133,234	151,817	140,091

Benefits

- Reduces the probability of outages due to electrical water-tree tracking by replacing porcelain arrestors, insulators and fuses
- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Reduces outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project were to be deferred, utility personnel will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. The deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Furthermore, the feeder will be exposed to increased outages due to animal and tree interference.

Portfolio: Overhead

Project Title: Convert Wiltshire 4kV B5W to 13.8kV System

Project Number: 19505

Project Year: 2013

Estimate Cost: $550,114

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B5W, originating from Wiltshire MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2013 to convert the entire 4kV load at Wiltshire MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to build two new 13.8kV feeders from Wiltshire TS to replace B5W. The expansion of these feeders includes approximately 0.52 km of overhead conductor, approximately 0.40 km of underground cable and 16 poles. The project area is bounded by Caledonia Park Road, St. Clair Avenue West, Wiltshire Avenue and Adian Avenue.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WILTSHIRE
STATION(S)	WILTSHIRE MS
FEEDER(S)	B5W

JUSTIFICATION

Project Background

Wiltshire MS was originally built in 1949 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Wiltshire MS and acquire valuable infrastructure for future initiatives.

Portfolio: Overhead

Project Title: Convert Junction 4kV B9J to 13.8kV

Project Number: 20476

Project Year: 2013

Estimate Cost: $593,152

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B9J, originating from Junction MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Junction MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 13.8kV feeder A257DN to replace B9J. The expansion of these feeders includes approximately 0.95 km of overhead conductor, 37 poles and 10 transformer locations. The project area is bounded by Indian Road, Parkside Avenue, Bloor Street and Howard Park Avenue.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	JUNCTION
STATION(S)	JUNCTION MS, DUFFERIN TS
FEEDER(S)	B9J, A257DN

JUSTIFICATION

Project Background

Junction MS was originally built in 1929 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

Converting 4kV overhead will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box construction pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, prolonged safety concerns for field crews related to box construction design will continue to persist. Moreover, THESL would also endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in

previous years in order to fully decommission Junction MS and acquire valuable infrastructure for future initiatives.

Portfolio:	Overhead
Project Title:	Replacement of Existing 600A Porcelain Switches
Project Number:	21705
Project Year:	2013
Estimate Cost:	$ 556,290

PROJECT DESCRIPTION

Objective:

The purpose of this project is to to replace 101 existing non-standard /defective 600A porcelain disconnect switches on streets around Runnymede, Strachan and Queen areas of downtown Toronto. These switches are located mainly on the 4kV system.

Scope:

The scope of work for this project is to refurbish the overhead lateral distribution system of the 4kV feeders in downtown Toronto, by replacing 101 600A porcelain disconnect switches located on 4kV feeders from Eglinton, Forman, Merton, Sherbourne, Hammersmith, Carlaw, Danforth, Kingsway, Rennie Park, Runnymede, Junction, Dufferin and Dupont MS as identified by the feeder patrol team.

DISTRICT	Toronto
DISTRICT NEIGHBOURHOOD	FORMER TORONTO AREA
STATION(S)	MULTIPLE STATIONS
FEEDER(S)	4 kV FEEDERS

JUSTIFICATION

Project Background

The 600A porcelain disconnect switches have developed cracks due to the repeated force of impact during the switch operations. The cracks may result in broken pieces of the switch that may fall off the switch and hurt pedestrians walking below. In addition the operator is required to hold a live conductor in the overhead bucket with a hot stick and this poses a potential hazard to the crew members and the general public. A program has been developed to remove these switches from our system over the next 3 years.

Benefits

- Provides safe work conditions and safety for the general public
- Modernizes the distribution system by standardizing and replacing obsolete, non-compliant equipment
- Reduces outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

The deferral of this project will lead to increase risk to THESL crews and the general public. The deferral of this project would allow porcelain switches to continue contributing to outages and in particular, lengthy outages that have inefficient restoration times. Also, the impact of customers is increased as a result of non-standard porcelain switches failing. The tendency of these assets to fail causes poor isolation and significantly reduces operational flexibility in restoring power.

Portfolio:	Overhead
Project Title:	Extend 47M13 on Meadowvale S Voltage Conversion - Electrical SCPJF2
Project Number:	20883
Project Year:	2013
Estimate Cost:	$ 532,284

PROJECT DESCRIPTION

Objective:

The objective of this project is partially convert PJF2 fed by Centenial Magee MS from 4kV to 27.6kV. This project is one phase of a multi-phase program to convert the entire 4kV load at Centenial D'Arcy Magee MS, with the final objective of decommissioning the station.

Scope:

The scope of this project involves ininstalling a 27.6kV overhead lines from Kingston Rd along Meadowvale South to Lawrence Ave. Install 3x1000 TRXLPE AL cable along Lawrence to the East to connect to the overhead switch and to West at Beachgrove- Lawrence intersection to tie with 47M7. Connect the new PMH-10 with the new cables. Install a SCADAmate switch at Beechgrove-Lawrence and Kingston-Meadowvale intersection. Reinstall two overhead switches. Install a single-phase 27.6kV overhead lines (ACSR 3/0) from Meadowvale along Colonel Danforth Tr to Install a 140k fused switch at Meadowvale- Colonel Danforth. Replace all the existing pole top transformers on Colonel Danforth and Bonacres overhead with THESL standard transformers. Dismantle 13.8kV lines on Colonel Danforth Tr.

The objective of this project is to extend NA47M13 feeder from Kingston Rd along Meadowvale South to connect with the same feeder at Lawrence Ave and extend further towards West to Beechgrove Dr. This is to provide operational flexibility of feeder 47M13 and also to build

27.6kV lines for voltage conversion of some of the old distribution areas built with direct buried cables.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MEADOWVALE & DOLONEL DANFORTH
STATION(S)	CENTENIAL D'ARCY MAGEE MS
FEEDER(S)	SCPJF2

JUSTIFICATION

Project Background

Centenial D'Arcy Magee MS was built around the 1960's to 1970's and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. A single-phase distribution for the three subdivisions (Bonacres Avenue and Whiteacres Avenue and Jean Dempsey Gate), was built between a time span of 1973 to 1977 with direct buried cables. It is supplied from the overhead feeder main of PJF2. The feeder had 4 outages and the project area had 3 outages in 2010 so far. In addition, the project needs to be carried out to accommodate residential load creep as well as load increase from future emerging businesses in the area.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			113
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,367	2,446	3,841
Feeder CMO ***(Cumulative)***	633,267	8,721	217,876

Benefits

- Replaces 45 year old failing direct buried cables for the industrial area.
- Improvement of the safety of THESL crew workers and the public
- Reduces maintenance costs by removing obsolete 4kV equipment
- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Increases capacity with 27.6kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Improves in the aesthetics of the street
- Reduces of system losses when 4kV is upgraded to 27.6kV
- Reconfigures the distribution for the latest THESL standard for operation and protection. (smaller loops with 1/0 cable with standard fuse)
- Targets to achieve better operational flexibility and more reliable supply.

IMPACT OF DEFERRAL

THESL would endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard 27.6kV equipment. If this project was to be deferred, prolonged safety concerns for field crews related to obsolete 4kV system will continue to persist. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program to fully decommission Centenial D'Arcy Magee MS.

PROJECTS $500K AND OVER FOR 2013

SUSTAINING PORTFOLIO – NETWORK

Table 1: Network Projects

Estimate Number	Project Title	Estimated Cost ($Millions)
19700	4KV Network Conversion – Queen Street West Between Spadina Avenue/Augusta Avenue	4.5
22406	Network Automation – Terauley South 120/208V Network	3.5
20821	Civil Construction – Queen Street West Between Portland Street/Bathurst Street Phase #1	3.1
20619	4KV Network Conversion – High Level MS Feeders B12H & B13H	2.9
19502	Wellington Street/Emily Street East & West Vaults (Loc.4790)	2.2
20635	4KV Network Conversion – High Level MS Feeders B13H Phase #2	2.1
20856	4KV Network Conversion – Queen Street West Between Augusta Avenue/Portland Street	1.9
20401	4KV Network Conversion – High Level MS Feeders B13H & B12H Phase #1	1.7
18834	New Vault - Eglinton Avenue East/Holly Street (Loc.4481)	1.6
20823	Primary & Secondary Cable Installation – Queen Street West Between Portland Street/Bathurst Street Phase #3	1.6
18899	Network Secondary Cable Replacement – Windsor West Network Phase #2	1.4
18901	Network Secondary Cable Replacement – Windsor West Network Phase #4	1.4
20472	Rebuild Peter Street/Adelaide Street West Vault A66WR (Loc.4299)	1.3
22400	Network Automation – Cecil North 120/208V Network	1.1
18896	Network Secondary Cable Replacement – Windsor West	1.0

Estimate Number	Project Title	Estimated Cost ($Millions)
	Network Phase #1	
18898	Network Secondary Cable Replacement – Windsor West Network Phase #3	1.0
18838	New Vault – St. Clair Avenue/Yonge Street A55H (Loc.4541)	0.9
20510	Vault Roof Rebuild – King Street West/Jordan Street A54WR (Loc.4562)	0.9
18912	Network Replacement (Loc.4407)	0.8
20822	Equipment Installation – Queen Street West Between Portland Street/Bathurst Street Phase #2	0.8
20377	Network Replacement (Loc.4372)	0.7
20707	Network Replacement – Dundas Street/Mutual Street (Loc.4509)	0.7
20498	Network Replacement – King Street/Yonge Street	0.7
20636	4KV Network Conversion – High Level MS Feeders B13H Phase #3	0.5
Total Cost		**38.3**

Portfolio:	Network
Project Title:	4KV Network Conversion – Queen Street West Between Spadina Avenue/Augusta Avenue
Project Number:	19700
Project Year:	2013
Estimate Cost:	$4,500,000

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to expand the secondary network along Queen Street between Spadina and Bathurst and remove obsolete 4kV box construction. The purpose of this project is specifically to convert the 4kV overhead plant to a secondary network along Queen Street between Spadina Avenue and Augusta Avenue.

Scope:

The scope of work for this project includes the initial inspections, construction of civil infrastructure, equipment installation of network units and service upgrades, coordination with customers on service upgrades, automation, installation of primary and secondary cables and removal of the 4kV overhead system and installation of street lighting poles to THESL standard to be supplied from the underground secondary network.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ENTERTAINMENT DISTRICT
STATION(S)	WINDSOR TS, DEFOE MS
FEEDER(S)	A64WR, A67WR, A68WR, A69WR, B3DF

JUSTIFICATION

Project Background

Defoe MS was originally built in the 1970's and has been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeder B3DF is of box construction type, by converting this 4kV feeder, it will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of Windsor West exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. This area is ideal for network supply because of the high density of customers and is a small commercial and tourism area. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of approximately 30 years' worth of 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (this occurs when 4kV is upgraded to 13.8kV)
- Improves reliability by use of the most reliable system available for dispersed

commercial loads

- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design would persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching the end of useful life.

Portfolio: Network

Project Title: Network Automation – Terauley South 120/280 V Network

Project Number: 22406

Project Year: 2013

Estimate Cost: $3,538,600

PROJECT DESCRIPTION

Objective:

The purpose of this project is to install network automation on an entire secondary grid network on the Terauley South network. In the process of automating this network, any concerns with the condition of vaults and network units will be addressed. Moreover, network units will be retrofitted or replaced, and vaults that pose a hazard to public and worker safety will be rebuilt. This project is an extension of a previous project THESL undertook to lay fibre to the vaults of this network.

Scope:

The scope of work for this project includes 27 network units that will be automated over 13 vaults. At least five network units will need to be replaced due to aging and/or the presence of fibretop protectors. In addition, it is estimated that at least seven vaults will need to be rebuilt. Work sssociated with supplying the customers of the secondary network temporarily, while the vault is being rebuilt, is also included in this project. Once the condition of both the network units and network vaults has been addressed, the network units will be wired for network automation and commissioned with Supervisory Control and Data Acquisition (“SCADA”) personnel.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	FINANCIAL DISTRICT
STATION(S)	TERAULEY TS
FEEDER(S)	A81A, A82A, A83A, A84A, A85A, A86A, A87A

JUSTIFICATION

Project Background

Network Automation is a grid modernization initiative to allow the Control Room visibility and control over the network system. Network automation allows the Control Room to monitor in real-time the conditions of the vault, protector and transformer. Loading of the network units is made available for real-time assessment and long-term analytics. Alarms are set on critical parameters of the system (transformer overloading, leaking, overheating, protector cycling, and vault flooding) so as to notify operations personnel of problematic vaults.

With the successful automation of a network vault at Davenport Road and Avenue Road, the Control Room requested piloting small grid networks for network automation. Briefly, the Control Room has had difficulty troubleshooting grid networks due to the complexity of the load flow in the secondary network system. Accordingly, this automation will allow visibility and control over the abovementioned networks.

This project is a component within the network automation initiative and covers installation/retrofitting of network units for automation, rebuilding hazardous vaults, and commissioning tests.

At least seven of the network vaults in the secondary network have been identified as been constructed in the 1950’s or early 1960’s. It is estimated that these vaults need to be rebuilt. Also, it has been identified that four network units contain fibretops and were manufactured in 1955 to early 1973. Protectors of the fibretop vintage are the oldest vintage of protectors in the system and are prone to causing catastrophic failures.

Benefits

- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves safety and structure strength of vaults through the construction of new vaults
- Eliminates the risk of catastrophic failure at the vault through the removal of fibretop protectors
- Mitigates the risk of network units (both transformers and protectors) from failing due to these assets having construction ages ranging from approximately 40 to 60 years

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would be unable to mitigate the public and safety risks associated with the network units, if one of the fibretop units were to fail. Furthermore, deferral of this work would also result in THESL losing the opportunity to modernize the system through the removal of fibretop protectors, which are a known legacy problem, as well as replace aging assets that are at or nearing their end of useful life.

Portfolio:	Network
Project Title:	Civil Construction – Queen Street West Between Portland Street/Bathurst Street Phase #1
Project Number:	20821
Project Year:	2013
Estimate Cost:	$3,102,966

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to expand the secondary network along Queen Street between Spadina and Bathurst and remove obsolete 4kV box construction. The purpose of this project is specifically to provide the civil infrastructure for network expansion along Queen Street between Portland Street and Bathurst Street. This project is the first phase of four phases to expand the network on this section of Queen Street.

Scope:

The scope of work for this project includes the intial inspection of the area of concern and the building of network vaults, cable chambers, and ducts. Two new network vaults will be built along this stretch and will include approximately 24 cable chambers. The civil infrascture will be used in subsequent phases.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ENTERTAINMENT DISTRICT
STATION(S)	WINDSOR TS, DEFOE MS
FEEDER(S)	A64WR, A67WR, A68WR, A69WR, B7DF

JUSTIFICATION

Project Background

Defoe MS was originally built in the 1970's and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeder B7DF is of box construction type, converting these 4kV feeders will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of Windsor West exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. This area is ideal for network supply because of the high density of customers and is a small commercial and tourism area. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of approximately 30 years worth of 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (this occurs when 4kV is upgraded to 13.8kV)
- Improves reliability by use of the most reliable system available for dispersed commercial loads

- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design would persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching end of useful life.

Portfolio:	Network
Project Title:	4KV Network Conversion – High Level MS Feeders B12H & B13H
Project Number:	20619
Project Year:	2013
Estimate Cost:	$2,863,273

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to eventually convert all of the 4kV loads at High Level MS. The purpose of this project is to partially convert existing B12H and B13H by removing obsolete 4kV box construction, and expanding the secondary network to supply the existing services. The objective of this project is specifically to provide civil infrastructure for the conversion between Summerhill Gardens in the east, Yonge Street in the west, Woodlawn Avenue in the north and Shaftesbury Avenue in the south.

Scope:

The scope of work for this project includes the intial inspection of the area of concern and building of network vaults, cable chambers, and ducts. Two new network vaults will be built along this block. This civil infrascture will be used in subsequent phases.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	SUMMERHILL
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A48H, A57H, B12H, B13H

JUSTIFICATION

Project Background

High Level MS was originally built in 1910 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeders B12H and B13H are of box construction type, converting these 4kV feeders will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of High Level St. Clair exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of over 100 years worth of 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (this occurs when 4kV is upgraded to 13.8kV)
- Improves reliability by the use of the most reliable system available for dispersed commercial loads

- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design would persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching end of useful life.

Portfolio: Network

Project Title: Wellington Street/Emily Street East & West Vaults (Loc.4790)

Project Number: 19502

Project Year: 2013

Estimate Cost: $2,227,087

PROJECT DESCRIPTION

Objective:

The objective of this project is to rebuild both east and west vaults at vault location 4790. This project would also include replacing the network units due to the condition of the equipment and automating the network vault.

Scope:

The scope of work for this project includes the vault rebuild of two vaults 4790W and 4790E including associated work with supplying the customers of the secondary network temporarily, while the vault is being rebuilt. In addition, this project would also involve the replacement of the existing network units with three 1500 kVA and 3000A protectors, one for each transformer, and THESL plans to automate the network units at this location. Furthermore, associated cabling work will be completed as per THESL standard.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ENTERTAINMENT DISTRICT/FINANCIAL DISTRICT
STATION(S)	WINDSOR TS
FEEDER(S)	A51WR, A55WR, A57WR

JUSTIFICATION

Project Background

The vaults were initially built in 1971 and the network units found in the vaults were generally of the same age. Specifically, for the east vault, the roof has experienced considerable wear and tear. There is cracking at the top of the perimeter wall. Some corrosion on the beams exists and one location, particularly, is in need of immediate attention. The walls are in satisfactory condition, but have been damaged by salt spraying and corrosion over the years. For the west vault, the roof also has considerable wear and tear showing on top of the lid. Moreover, the rebar is exposed and the top perimeter of the walls has been damaged. Large longitudinal cracks have formed in the middle of the north and south walls, and accordingly have been deemed a high priority by THESL.

Given the structural and safety concerns of civil components of these vaults, further deterioration could reduce their structural integrity and pose a safety hazard to the public. This project would also include the replacement of Paper Insulated Lead Covered (“PILC”) and Asbestos Insulated Lead Covered (“AILC”) cables.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage from network units (both transformers and protectors) failing due to the condition of approximately 30 year-old equipment
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, safety risks associated with the vault walls and roof would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk for collateral damage to the network equipment in the event of the vault failing, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project were to be deferred, there is the added consequence of PILC and AILC cables remaining in the system.

Portfolio:	Network
Project Title:	4KV Network Conversion – High Level MS Feeders B13H Phase #2
Project Number:	20635
Project Year:	2013
Estimate Cost:	$2,121,880

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to eventually convert all of the 4kV loads at High Level MS. This project will partially convert existing B12H and B13H by removing obsolete 4kV box construction, and expanding the secondary network to supply the existing services. As such, the purpose of this project is specifically conversion along Walker Avenue west of Yonge Street.

Scope:

The scope of work for this project includes the initial inspections, civil infrastructure, equipment installation of network units and service upgrades, coordination with customers on service upgrades, automation, installation of primary and secondary cables, and removal of the 4kV overhead system and installation of street lighting poles to THESL standard to be supplied from the underground secondary network.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	SUMMERHILL
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A47H, A49H, B13H

JUSTIFICATION

Project Background

High Level MS was originally built in 1910 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeders B12H and B13H are of box construction type, converting these 4kV feeders will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of High Level St. Clair exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of over 100 year-old 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (this occurs when 4kV is upgraded to 13.8kV)
- Improves reliability by use of the most reliable system available for dispersed commercial loads
- Enables automation capabilities to allow remote monitoring and control from the

Control Room for troubleshooting and addressing system problems

- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design would persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching end of useful life.

Portfolio:	Network
Project Title:	4KV Network Conversion – Queen Street West Between Augusta Avenue/Portland Street
Project Number:	20856
Project Year:	2013
Estimate Cost:	$1,937,000

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to expand the secondary network along Queen Street between Spadina Avenue and Bathurst Street and remove obsolete 4kV box construction. The purpose of this project is specifically to convert the 4kV overhead plant to secondary network along Queen Street between Portland Street and Augusta Avenue.

Scope:

The scope of work for this project includes the initial inspections, civil infrastructure construction, equipment installation of network units and service upgrades, coordination with customers on service upgrades, automation, installation of primary and secondary cables, and removal of the 4kV overhead system and installation of street lighting poles to THESL standard to be supplied from the underground secondary network.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ENTERTAINMENT DISTRICT
STATION(S)	WINDSOR TS, DEFOE MS
FEEDER(S)	A64WR, A67WR, A68WR, A69WR, B7DF, B3DF

JUSTIFICATION

Project Background

Defoe MS was originally built in the 1970's and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeders B7DF and B3DF are of box construction type, converting these 4kV feeders will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of Windsor West exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. This area is ideal for network supply because of the high density of customers and is a small commercial and tourism area. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of approximately 30 year-old 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (this occurs when 4kV is upgraded to 13.8kV)

- Improves reliability by use of the most reliable system available for dispersed commercial loads
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design would persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching end of useful life.

Portfolio:	Network
Project Title:	4KV Network Conversion – High Level MS Feeders B13H & B12H Phase #1
Project Number:	20401
Project Year:	2013
Estimate Cost:	$1,648,227

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to eventually convert all of the 4kV loads at High Level MS. This project is to partially convert existing B12H and B13H by removing obsolete 4kV box construction, and expanding the secondary network to supply the existing services. As such, the purpose of this project is specifically to install electrical infrastructure for the conversion between Summerhill Gardens in the east, Yonge Street in the west, Woodlawn Avenue in the north and Shaftesbury Avenue in the south.

Scope:

The scope of work for this project includes the initial inspections, equipment installation of network units and service upgrades, coordination with customers on service upgrades, automation, installation of primary and secondary cables, and removal of the 4kV overhead system and installation of street lighting poles to THESL standard to be supplied from the underground secondary network.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	SUMMERHILL
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A48H, A57H, B12H, B13H

JUSTIFICATION

Project Background

High Level MS was originally built in 1910 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeders B12H and B13H are of box construction type, converting these 4kV feeders will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of High Level St. Clair exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of over 100 year-old 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment

- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (this occurs when 4kV is upgraded to 13.8kV)
- Improves reliability by the use of the most reliable system available for dispersed commercial loads
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design would persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching end of useful life.

Portfolio: Network

Project Title: New Vault – Eglinton Avenue East/Holly Street (Loc.4481)

Project Number: 18834

Project Year: 2013

Estimate Cost: $1,640,794

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild and to relocate the network vault as well as replace network units due to their condition. This project would also involve the replacement of PILC cables and would include automating the network vault.

Scope:

The scope of work for this project is to rebuild a network vault, including the replacement of all associated cabling work that needs to be carried out, especially PILC cables identified in the vicinity of the project area, to the current THESL standard. It would also involve the installation of two 750kVA transformers with 3000A protectors, one for each transformer, and THESL plans to automate the network units at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	MIDTOWN
STATION(S)	DUPLEX TS
FEEDER(S)	A53DX, A55DX

JUSTIFICATION

Project Background

The vault was built in 1961. A civil inspection found that the walls and roof of the vault are cracked, and that the roof has become a tripping hazard. Moreover, the customer has built a step on top of the vault. Thus, given the structural and safety concerns of civil components of this vault, further deterioration could reduce the structural integrity of the vault and pose a safety hazard to the public.

The network units found in vault 4481 were manufactured in 1979, 1998, and 2000. Accordingly, this project would also include the replacement of Paper Insulated Lead Covered (“PILC”) and Asbestos Insulated Lead Covered (“AILC”) cables.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage to network units (both transformers and protectors) failing due to the condition of equipment ranging from approximately 11 to 30 years
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, safety risks associated with the vault walls and roof would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk of collateral damage to the network equipment in the event of the vault failing, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project were to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio:	Network
Project Title:	Primary & Secondary Cable Installation – Queen Street West Between Portland Street/Bathurst Street Phase #3
Project Number:	20823
Project Year:	2013
Estimate Cost:	$1,570,534

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to expand the secondary network along Queen Street between Spadina and Bathurst and remove obsolete 4kV box construction. The purpose of this project is specifically to install primary and secondary cables along Queen Street between Portland Street and Bathurst Street. This project is the third phase of four phases to expand the network on this section of Queen Street.

Scope:

The scope of work for this project includes the installation of primary cables, and secondary cables. The service cables will need to be installed up to the customer service panels.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ENTERTAINMENT DISTRICT
STATION(S)	WINDSOR TS, DEFOE MS
FEEDER(S)	A64WR, A67WR, A68WR, A69WR, B7DF

JUSTIFICATION

Project Background

Defoe MS was originally built in the 1970's and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeder B7DF is of box construction type, converting this 4kV feeder will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of Windsor West exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. This area is ideal for network supply because of the high density of customers and is a small commercial and tourism area. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of approximately 30 year-old 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (this occurs when 4kV is upgraded to 13.8kV)
- Improves reliability by use of the most reliable system available for dispersed

commercial loads
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design would persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching end of useful life.

Portfolio:	Network
Project Title:	Network Secondary Cable Replacement – Windsor West Network Phase #2
Project Number:	18899
Project Year:	2013
Estimate Cost:	$1,366,704

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace Asbestos Insulated Lead Cable (“AILC”) with Ethylene Propylene Rubber with Hypalon Jacket (“EPRH”) cables in the low voltage secondary network from the Windsor West network.

Scope:

The scope of work for this project is bounded by Simcoe Street, John Street, Richmond Street and Grange Street, and would involve replacing approximately 7,500m of network secondary AILC cables with EPRH Cables. The total length of AILC cables on the Windsor West network is approximately 30,300 m. AILC will also be removed from all network vaults and customer facilities, and EPRH cables will be terminated at cable chambers using current limiters and homacs. To accommodate future expansion, at least one spare position should be available on each homac.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WINDSOR
STATION(S)	WINDSOR TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Asbestos Insulated Lead Cable ("AILC") contains two health hazards that THESL would like to address. Asbestos may cause illness to people who are exposed to it on a day-to-day basis. There has been a conscious effort to remove all asbestos from the distribution system. Lead is also a health concern for THESL crews that are exposed to it on a regular basis; it can cause damage to the nervous system and has other detrimental health effects. Finally, there are no manufacturers of AILC, so in case of failure, AILC must be replaced with EPRH cable.

Alternatives

AILC cable could be left in place and there would be no effect on the distribution system. The cable could be replaced as it fails and the replacement would occur in a larger time frame.

Benefits

- Improves the health and safety of THESL crew workers and the public
- Standardizes network secondary cable

IMPACT OF DEFERRAL

If this project were to be deferred, prolonged health and safety concerns for field crews related to AILC cable will persist. In addition, due to a lack of manufacturers of AILC cable, it is also possible that future outages may last longer due to the lack of space in cable chambers to install new cable.

Portfolio:	Network
Project Title:	Network Secondary Cable Replacement – Windsor West Phase #4
Project Number:	18901
Project Year:	2013
Estimate Cost:	$1,366,704

PROJECT DESCRIPTION

Objective:
The purpose of this project is to replace Asbestos Insulated Lead Cable ("AILC") with Ethylene Propylene Rubber with Hypalon Jacket ("EPRH") cables in THESL low voltage secondary network from the Windsor West network.

Scope:
The scope of work for this project is bounded by Beverley Street, Brant Street, Richmond Street and Nassau Street, and would involve replacing approximately 7,500m on average of network secondary AILC cables with EPRH Cables. As such, the total length of AILC cables on the Windsor West network is approximately 30,300m.AILC will be removed from all network vaults and customer facilities, and EPRH cables will be terminated at cable chambers using current limiters and homacs. To accommodate future expansion, at least one spare position should be available on each homac.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WINDSOR
STATION(S)	WINDSOR TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Asbestos Insulated Lead Cable ("AILC") contains two health hazards that THESL would like to address. Asbestos may cause illness to people who are exposed to it on a day-to-day basis. There has been a conscious effort to remove all asbestos in the distribution system. Lead is also a health concern for THESL crews that are exposed to it on a regular basis; it can cause damage to the nervous system and has other detrimental health effects. Finally, there are no manufacturers of AILC cable, so in case of failure, AILC must be replaced with EPRH cable.

Alternatives

AILC cable could be left in place and there would be no affect on the distribution system. The cable could be replaced as it fails and the replacement would occur in a larger time frame.

Benefits

- Improves the health and safety of THESL crew workers and the public
- Standardizes network secondary cable

IMPACT OF DEFERRAL

If this project were to be deferred, prolonged health and safety concerns for field crews related to AILC cable will persist. In addition, due to a lack of manufacturers of AILCcable, it is also possible that future outages may last longer due to the lack of space in cable chambers to install new cable.

Portfolio:	Network
Project Title:	Rebuild Peter Street/Adelaide Street West Vault A66WR (Loc.4299)
Project Number:	20472
Project Year:	2013
Estimate Cost:	$1,260,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to relocate an existing vault. In addition to this, a network unit will be replaced due to its condition, and THESL plans to automate and look for opportunities to ruggedize the network unit.

Scope:

The scope of work for this project includes building a new vault and abandoning the existing vault, including associated work with supplying the customers of the secondary network temporarily, while the vault is being rebuilt. In addition, this project also includes the replacement of the existing network unit with one 750 kVA and 3000A protector, along with building new ducts and cable chambers. Lastly, associated cabling work will be completed as per THESL standard, and network automation will be installed at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ENTERTAINMENT DISTRICT
STATION(S)	WINDSOR TS
FEEDER(S)	A66WR

JUSTIFICATION

Project Background

The vault was initially built in 1951. The vault roof has some moderate corrosion and the vault walls are nearing the end of their useful lifecycle due to age. There is considerable cracking and large spalling in the east wall. Additionally, the wall is bulging under load and soil pressure. Furthermore, the existing network unit has a ventilated protector, which is prone to damages from flooding and moisture in the vault. Given the structural and safety concerns of civil components of this vault, further deterioration could reduce the structural integrity of the vault and pose a safety hazard to the public. This project would also include the replacement of Paper Insulated Lead Covered ("PILC") and Asbestos Insulated Lead Covered ("AILC") cables.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage from network units (both transformers and protectors) failing given that the equipment is 60 years old, as well as from the presence of moisture and water in the vault
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, safety risks associated with the vault walls would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk for collateral damage to the network equipment in the event of the vault failing, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project were to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio: Network

Project Title: Network Automation – Cecil North 120/208 V Network

Project Number: 22400

Project Year: 2013

Estimate Cost: $1,115,400

PROJECT DESCRIPTION

Objective:

The purpose of the project is to install network automation on an entire secondary grid network on the Cecil North network. In the process of automating this network, any concerns with the condition of vaults and network units will be addressed. Network units will be retrofitted or replaced, and vaults that pose a hazard to public and worker safety will be rebuilt. This project is an extension of a previous project THESL undertook to lay fiber to the vaults of this network.

Scope:

The scope of work for this project includes 10 network units that will be automated over six vaults. At least two network units will need to be replaced due to aging and/or the presence of fibretop protectors. In addition, it is estimated that at least two vaults will need to be rebuilt. Associated work with supplying the customers of the secondary network temporarily, while the vault is being rebuilt, is also included in this project. Once both the condition of the network units and network vaults have been addressed, network units will be wired for network automation and commissioned with Supervisory Control and Data Acquisition (“SCADA”) personnel.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	KENSINGTON MARKET/HARBORD VILLAGE/CHINATOWN
STATION(S)	CECIL TS
FEEDER(S)	A70CE, A71CE, A72CE

JUSTIFICATION

Project Background

Network Automation is a grid modernization initiative to allow the Control Room visibility and control over the network system. Network automation allows the Control Room to monitor in real-time the conditions of the vault, protector and transformer. Loading of the network units is made available for real-time assessment and long-term analytics. Alarms are set on critical parameters of the system (transformer overloading, leaking, overheating, protector cycling, and vault flooding) so as to notify operations personnel of problematic vaults.

With the successful automation of a network vault at Davenport Road and Avenue Road, the Control Room requested piloting small grid networks for network automation. Briefly, the Control Room has had difficulty troubleshooting grid networks due to the complexity of the load flow in the secondary network system. Accordingly, this automation will allow visibility and control over the above mentioned networks.

This project is a component within the network automation initiative and covers installation/retrofitting of network units for automation, rebuilding hazardous vaults, and commissioning tests.

At least two of the network vaults in the secondary network have been identified as having been constructed in 1957. It is estimated that these vaults need to be rebuilt. Also it has been identified that two network units contain fibretops and were manufactured in 1958 and 1968. Protectors of the fibretop vintage are the oldest vintage of protector in the system and are prone to causing catastrophic failures.

Benefits

- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves safety and structure strength of the vault through the construction of new vaults
- Eliminates the risk of catastrophic failure at the vault through the removal of fibretop protectors
- Mitigates the risk of network units (both transformers and protectors) from failing due to assets with construction ages ranging from approximately 43 to 55 years

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would be unable to mitigate the public and safety risks associated with the network units, if one of the fibretop units were to fail. Furthermore, deferral of this work would also result in THESL losing the opportunity to modernize the system through the removal of fibretop protectors, which are a known legacy problem, as well as replace aging assets that are at or nearing the end of their useful life.

Portfolio:	Network
Project Title:	Network Secondary Cable replacement – Windsor West Phase #1
Project Number:	18896
Project Year:	2013
Estimate Cost:	$1,029,531

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace Asbestos Insulated Lead Cable ("AILC") with Ethylene Propylene Rubber with Hypalon Jacket ("EPRH") cables in THESL's low voltage secondary network in the Windsor West network.

Scope:

The scope of work for this project is bounded by Simcoe Street, Widmer Street, Richmond Street and Front Street, and would involve replacing approximately 7,500 m of network secondary AILC cables with EPRH Cables. The total length of AILC cables on the Windsor West network is approximately 30,300 m. AILC also will be removed from all network vaults and customer facilities, and EPRH cables will be terminated at cable chambers using current limiters and homacs. To accommodate future expansion, at least one spare position should be available on each homac.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WINDSOR
STATION(S)	WINDSOR TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Asbestos Insulated Lead Cable ("AILC") contains two health hazards that THESL would like to address. Asbestos may cause illness to people who are exposed to it on a day-to-day basis. There has been a conscious effort to remove all asbestos in the distribution system. Lead is also a health concern for THESL crews that are exposed to it on a regular basis; it can cause damage to the nervous system and has other detrimental health effects. Finally, there are no manufacturers of AILC cable, so in case of failure, AILC must be replaced with EPRH cable.

Alternatives

AILC cable could be left in place and there would be no effect on the distribution system. The cable could be replaced as it fails and the replacement would occur in a larger time frame.

Benefits

- Improves the health and safety of THESL crew workers and the public
- Standardizes network secondary cable

IMPACT OF DEFERRAL

If this project were to be deferred, prolonged health and safety concerns for field crews related to AILC cable would persist. In addition, due to a lack of manufacturers of AILC cable, it is also possible that future outages may last longer due to the lack of space in cable chambers to install new cable.

Portfolio:	Network
Project Title:	Network Secondary Cable Replacement – Windsor West Phase #3
Project Number:	18898
Project Year:	2013
Estimate Cost:	$1,029,531

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace Asbestos Insulated Lead Cable ("AILC") with Ethylene Propylene Rubber with Hypalon Jacket ("EPRH") cables in THESL low voltage secondary network in the Windsor West network.

Scope:

The scope of work for this project is bounded by Brant Street, Widmer Street, Richmond Street and Front Street, and would involve replacing approximately 7,500 m of network secondary AILC cables with EPRH Cables. The total length of AILC cables on the Windsor West network is approximately 30,300 m. AILC will also be removed from all network vaults and customer facilities, and EPRH cables will be terminated at cable chambers using current limiters and homacs. To accommodate future expansion, at least one spare position should be available on each homac.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	WINDSOR
STATION(S)	WINDSOR TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Asbestos Insulated Lead Cable ("AILC") contains two health hazards that THESL would like to address. Asbestos may cause illness to people who are exposed to it on a day-to-day basis. There has been a conscious effort to remove all asbestos in the distribution system. Lead is also a health concern for THESL crews that are exposed to it on a regular basis; it can cause damage to the nervous system and has other detrimental health effects. Finally, there are no manufacturers of AILC cable, so in case of failure, AILC must be replaced with EPRH cable.

Alternatives

AILC cable could be left in place and there would be no effect on the distribution system. The cable could be replaced as it fails and the replacement would occur in a larger time frame.

Benefits

- Improves the health and safety of THESL crew workers and the public
- Standardizes network secondary cable

IMPACT OF DEFERRAL

If this project were to be deferred, prolonged health and safety concerns for field crews related to AILC cable would persist. In addition, due to a lack of manufacturers of AILC cable, it is also possible that future outages may last longer due to the lack of space in cable chambers to install new cable.

Portfolio: Network

Project Title: New Vault – St. Clair Avenue/Yonge Street A55H (Loc.4541)

Project Number: 18838

Project Year: 2013

Estimate Cost: $938,517

PROJECT DESCRIPTION

Objective:

The purpose of this project is to relocate the existing network vault, as well as replace network units due to corrosion. This project would also involve the replacement of PILC cables and would include automating the network vault.

Scope:

The scope of work for this project is to relocate an existing network vault, and replace all associated cabling work that needs to be carried out, especially PILC cables identified in the vicinity of the project area to the current THESL standard. It would also involve the installation of two 2000kVA transformers with 3000A protectors, one for each transformer, and THESL plans to automate the network units at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DEER PARK
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A55H, A56H

JUSTIFICATION

Project Background

The vault was initially built around 1965. The vault roof is in satisfactory condition. However, the vault walls are in poor shape due to spalling and porosity. There is no mechanical protection for the racked cables, and the hanger is cutting into the cables. These conditions pose a danger for stray current. Given the structural and safety concerns of civil components of this vault, further deterioration could reduce the structural integrity of the vault and pose a safety hazard to the public. This project would also include the replacement of Paper Insulated Lead Covered ("PILC") and Asbestos Insulated Lead Covered ("AILC") cables.

Moreover, the two network units in the vault were manufactured in 1988 and 2003. Based on the inspection information, the older transformer is also showing signs of corrosion and has a fibretop protector. Protectors of the fibretop vintage are the oldest vintage of protector in the system and are prone to causing catastrophic failures.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage from network units (both transformers and protectors) failing due to the condition of 23-year-old equipment
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, safety risks associated with the vault walls and roof would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk for collateral damage to the network equipment in the event of the vault or fibretop protector failing, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project were to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio:	Network
Project Title:	Vault Roof Rebuild – King Street West/Jordan Street A54WR (Loc.4542)
Project Number:	20510
Project Year:	2013
Estimate Cost:	$910,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the network vault roof and all associated PILC cables. In addition to this, network units will be replaced and automated, (i.e., transformer and protector).

Scope:

The scope of work for this project is to relocate and construct a network vault and all associated cabling that needs to be carried out, especially PILC cable in the vicinity of the project area, to current THESL standard. It would also involve the installation of two 1500 kVA transformers with 1875A protectors, one for each transformer, and THESL plans to automate the network units at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	FINANCIAL DISTRICT
STATION(S)	WINDSOR TS
FEEDER(S)	A54WR, A58WR

JUSTIFICATION

Project Background

The vault was initially built in 1964. Over the years the roof of this vault has developed cracks. Upon a civil inspection it was found that the roof of the vault is cracked. Given the structural and safety concerns of civil components of this vault, further deterioration could reduce the structural integrity of the vault and pose a safety hazard to the public.

The two network units found in the vault were manufactured in 1960 and 1968. The network units also have fibretop protectors. Protectors of the fibretop vintage are the oldest vintage of protector in the system and are prone to causing catastrophic failures. This project would also include the replacement of Paper Insulated Lead Covered (“PILC”) and Asbestos Insulated Lead Covered (“AILC”) cables.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage from network units (both transformers and protectors) failing due to the condition of equipment with an average age of 47 years
- Modernizes the system through the removal of the fibretop protectors
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, safety risks associated with the vault walls and roof would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk for collateral damage to the network equipment in the event of the vault or fibretop protectors failing, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project were to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio: Network

Project Title: Network Replacement (Loc. 4407)

Project Number: 18912

Project Year: 2013

Estimate Cost: $805,747

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing network transformer units due to aging, corrosion and the presence of fibretop protectors. In addition, the project would also include rebuilding the network vault.

Scope:

The scope of work for this project includes the replacement of the existing network unit with one 750 kVA and 3000A protector. In addition, a vault rebuild will be completed, which would include all work associated with supplying customers of the secondary network temporarily, while the new vault is being constructed. Furthermore, associated cabling work will be completed as per current THESL standard.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	SUMMERHILL
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A55H, A47H

JUSTIFICATION

Project Background

The network unit found in the vault was installed in 1969. The network unit also has a fibretop protector. Protectors of the fibretop vintage are the oldest vintage of protector in the system and are prone to causing catastrophic failures. The vault was initially built in 1957. Upon a civil inspection, the roof was found to be in poor condition and the ladder and ladderway enclosure need to be rebuilt. Over the years, the walls of this vault have also developed spalling, exposing the rebar of the vaults that could potentially compromise the structural support of the vault. Lastly, cabling work planned for this project includes the replacement of Paper Insulated Lead Covered ("PILC") and Asbestos Insulated Lead Covered ("AILC") cables.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage from network units (both transformers and protectors) failing due to the condition of the 42 years old equipment
- Eliminates the risk of catastrophic failure at the vault through the removal of fibretop protectors
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, safety risks associated with the vault walls and roof would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk for collateral damage to the network equipment in the event of the vault failing, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project were to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio:	Network
Project Title:	Equipment Installation – Queen Street West Between Portland Street/Bathurst Street Phase #2
Project Number:	20822
Project Year:	2013
Estimate Cost:	$811,189

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to expand the secondary network along Queen Street between Spadina and Bathurst and remove obsolete 4kV box construction. The purpose of this project is specifically to install equipment for network expansion along Queen Street between Portland Street and Bathurst Street. This project is the second phase of four phases to expand the network on this section of Queen Street

Scope:

The scope of work for this project includes the installation of four network units, dry-type transformers, and service panels. Customer service panels may need to be upgraded or changed due to the conversion. Customers with voltage services other than 208Y/120V will need special equipment and/or modifications to existng equipment. This project will cover coordination with customers of these service changes. THESL plans to also automate the network units at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ENTERTAINMENT DISTRICT
STATION(S)	WINDSOR TS, DEFOE MS
FEEDER(S)	A64WR, A67WR, A68WR, A69WR, B7DF

JUSTIFICATION

Project Background

Defoe MS was originally built in the 1970's and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeder B7DF is of box construction type, converting this 4kV feeder will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of Windsor West exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. This area is ideal for network supply because of the high density of customers and is a small commercial and tourism area. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of approximately 30-year-old 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (occurs when 4kV is upgraded to 13.8kV)
- Improves reliability by use of the most reliable system available for dispersed commercial loads
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design will persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching end of useful life.

Portfolio: Network

Project Title: Network Replacement (Loc.4372)

Project Number: 20377

Project Year: 2013

Estimate Cost: $738, 284

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing network transformer units due to age, as well as automate the network vault.

Scope:

The scope of work for this project includes replacement of the existing network units with two 750 kVA and 3000A protectors, one for each transfomer. Furthermore, associated cabling work will be completed as per current THESL standard. Finally, THESL plans to have network automation at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DOWNTOWN YONGE
STATION(S)	TERAULEY TS
FEEDER(S)	A61A, A62A

JUSTIFICATION

Project Background

The two network units in this vault were manufactured in 1981 and cabling work planned for this project would include the replacement of Paper Insulated Lead Covered ("PILC") and Asbestos Insulated Lead Covered ("AILC") cables.

Benefits

- Mitigates the risk of collateral damage from network units (both transformers and protectors) failing due to the condition of the 30-year-old equipment
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would lose the opportunity to modernize the system, and gain greater visibility on the operation and condition of the network unit via automation. Additionally, if this project were to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio:	Network
Project Title:	Network Replacement – Dundas Street/Mutual Street (Loc.4509)
Project Number:	20707
Project Year:	2013
Estimate Cost:	$710,582

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing network transformer units due to ageing, corrosion, leaking, and the presence of fibretop protectors. In addition, the project would also include automating the network vault.

Scope:

The scope of work for this project includes replacement of the existing network units with two 500 kVA and 1875A protectors, one for each transformer. Furthermore, associated cabling work will be completed as per current THESL standard and THESL plans to have network automation at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DOWNTOWN YONGE
STATION(S)	TERAULEY TS
FEEDER(S)	A62A, A67A

JUSTIFICATION

Project Background

The two network units in this vault are 60 years old. The network units also have fibretop protectors. Protectors of the fibretop vintage are the oldest vintage of protector in the system and are prone to causing catastrophic failures. Based on the findings from inspections conducted on the units, the transformers are leaking transformer oil and are corroded at the base of the transformer, due to the existing environmental conditions of the vault. The roof has been damaged by an icing agent and has some wear and tear and some of the beams and their connections have been affected by water and salt corrosion. In addition, cabling work planned for this project includes the replacement of Paper Insulated Lead Covered ("PILC") and Asbestos Insulated Lead Covered ("AILC") cables.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage to network units (both transformers and protectors) failing due to the condition of the 51-year-old equipment
- Eliminates the risk of catastrophic failure at the vault through the removal of fibretop protectors
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, safety risks associated with the vault walls and roof would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk for collateral damage to the network equipment in the event of the vault failing or leaking transformer oil, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project were to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio:	Network
Project Title:	Network Replacement – King Street/Yonge Street
Project Number:	20498
Project Year:	2013
Estimate Cost:	$661,664

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing network transformer units due to aging, corrosion, leaking, and the presence of fibretop protectors. In addition, the project would also include automating the network vault.

Scope:

The scope of work for this project includes the replacement of the existing network units with two 500 kVA and 1875A protectors, one for each transformer. Furthermore, associated cabling work will be completed as per current THESL standard and THESL plans to have network automation at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	FINANCIAL DISTRICT
STATION(S)	GEORGE AND DUKE MS
FEEDER(S)	A77GD, A78GD

JUSTIFICATION

Project Background

The two network units in this vault were manufactured in 1949. The network units also have fibretop protectors. Protectors of the fibretop vintage are the oldest vintage of protector in the system and are prone to causing catastrophic failures. Based on the findings from inspections conducted on the units, the transformers are leaking transformer oil and are corroded at the base of the transformer due to the existing environmental conditions of the vault. Cabling work planned for this project includes the replacement of Paper Insulated Lead Covered ("PILC") and Asbestos Insulated Lead Covered ("AILC") cables.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage from network units (both transformers and protectors) failing due to the condition of the 51-year-old equipment
- Eliminates the risk of catastrophic failure at the vault through the removal of fibretop protectors
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project were to be deferred, safety risks associated with the vault walls and roof would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk for collateral damage to the network equipment in the event of the vault failing or leaking transformer oil, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project were to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio:	Network
Project Title:	4KV Network Conversion – High Level MS Feeders B13H Phase #3
Project Number:	20636
Project Year:	2013
Estimate Cost:	$506,179

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to eventually convert all of the 4kV loads at High Level MS. This project is to partially convert existing B12H and B13H by removing obsolete 4kV box construction, and expanding the secondary network to supply the existing services. As such, the purpose of this project is specifically, conversion along Alcorn Avenue west of Yonge Street.

Scope:

The scope of work for this project includes the initial inspections, civil infrastructure, equipment installation of network units and service upgrades, coordination with customers on service upgrades, automation, installation of primary and secondary cables, and removal of the 4kV overhead system and installation of street lighting poles to THESL current standard to be supplied from the underground secondary network.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	SUMMERHILL
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A47H, A49H, B13H

JUSTIFICATION

Project Background

High Level MS was originally built in 1910 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeders B12H and B13H are of box construction type, converting these 4kV feeders will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of High Level St. Clair exists nearby and can be extended to improve the long-term reliability of the area as the secondary network system is the most reliable system for this type of load. Removing the 4kV box construction and replacing it with secondary network will greatly improve the aesthetics at this location.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of over 100-year-old 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses (this occurs when 4kV is upgraded to 13.8kV)
- Improves reliability by use of the most reliable system available for dispersed commercial loads
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems

- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design will persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching end of useful life.

PROJECTS $500K AND OVER FOR 2013

SUSTAINING PORTFOLIO - STATIONS

Table 1: Stations Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
20492	Replace Duplex TS A5-6DX Switchgear	5.9
22476	Replace Carlaw TS A4-5E Switchgear	5.8
21702	Commission Strachan TS A11-12T Switchgear	2.8
21348	Sonnet Upgrade OC-3 to OC-12	0.9
21581	Replace Neilson Drive MS 4KV Switchgear	0.9
21656	Replace Bermondsey TS 4 KSO Circuit Breakers	0.8
21338	Replace Greencedar Lawrence MS Switchgear & Install SCADA/RTU	0.5
21804	Replace Lawrence Golf T1 MS Switchgear	0.5
22806	Replace Etobicoke MOSCAD RTUs	0.5
Total Cost		18.6

Portfolio: Stations

Project Title: Replace Duplex TS A5-6DX Switchgear

Project Number: 20492

Project Year: 2013

Estimate Cost: $ 5,866,980

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing A5-6DX switchgear at Duplex TS.

Scope:

The scope of work for this project is to install, commission, and energize the new 3000A gas-insulated switchgear ("GIS") to replace the existing A5-6DX switchgear at Duplex TS.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	400 DUPLEX STREET
STATION(S)	DUPLEX TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Duplex TS has three switchgears all located in the same basement floor of the Duplex TS building. The switchgears are of non arc-resistant type and this type of design has a high risk of collateral damage and personnel safety in an eventful failure. The switchgears at Duplex TS, being in the basement, have additional risk of being flooded with water that could interfere with the performance of the switchgears and could result in prolonged outages to a large number of customers. Moreover, the deluge system installed on the first floor above the switchgear in the basement poses a high risk of water flooding and malfunction, while in operation.

The A1-2 DX switchgear at Duplex TS is the oldest of the three switchgears and is approaching its end of useful life. The A1-2DX, A3-4DX and A5-6DX switchgear were manufactured in 1968, 1974, and 1975, respectively. Infrared scanning showed hot spots in the switchgear due to the corona effect, so the risk of collateral damage and personnel safety due to an eventful failure is increasing. However, due to the existing physical arrangement, access to the A1-2DX switchgear for replacement is being obstructed by the A5-6DX switchgear, causing difficulties to replace A1-2DX switchgear first. Therefore, to meet this space constraint, the A5-6DX switchgear will be replaced first with a GIS switchgear, followed by replacement of theA1-2DX switchgear replacement. Lastly, an on-site investigation has confirmed that there is inadequate space for an air-insulated double bus, double breaker or air-insulated breaker and half design.Therefore, to reduce the risk of collateral damage, improve water resistancy and to fit all switchgears in the available space, all the switchgears at Duplex TS are to be replaced with the gas-insulated switchgears (“GIS”) in stages.

Alternatives

Replacing the A5-6DX switchgear with an air insulated arc-resistant switchgear was considered as an option, but due to space limitations and the risk of water flooding associated with the equipment being in the basement, this option was rejected.

Benefits

- Improves reliability due to switching components being completely sealed in SF6 gas that has excellent insulation and arc quenching properties
- Improves personnel safety due to all live parts of the switchgear being entirely sealed

in an earthed metal enclosure and diffusion of any faults inside the switchgear through the high pressure SF6 gas barrier

- Reduces maintenance and operating costs due to the use of sealed components in the gas-insulated switchgear
- Uses less space as the gas-insulated switchgear is compact and is an attractive option for installation in substations with space constraints
- Increases bus capacity ratings to meet future load growth given that the rating of the new switchgear is 72MVA compared to the existing switchgear rating of 49MVA and would support any future load growth or load transfer requirements from neighbouring substations during contingency events

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would continue to rely on deteriorated switchgear that would increase the risk of failure and worsening system reliability, given that the switchgear is located in the basement and susceptible to water leaks and flooding. Moreover, deferral of the A5-6DX switchgear at Duplex TS would result in the deferral for replacing the next switchgear A1-2DX, since the A5-6DX switchgear replacement project needs to be completed first to make the space necessary for the replacement of switchgear A1-2DX. Lastly, deferral of this work would also increase safety risks to THESL personnel due to the lack of the arc-resistance design feature, and would limit the capability to meet future load growth and transfers from adjacent station(s) in the event of an outage.

Portfolio: Stations

Project Title: Replace Carlaw TS A4-5E Switchgear

Project Number: 22476

Project Year: 2013

Estimate Cost: $5,760,874

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing A4-5E switchgear at Carlaw TS.

Scope:

The scope of work for this project is to install, commission, and energize the new 3000A air-insulated switchgear (“AIS”) with arc-resistant switchgear to replace the existing A4-5E switchgear at Carlaw TS.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	369 CARLAW AVENUE
STATION(S)	CARLAW TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The A4-5E switchgear at Carlaw TS was installed in 1950 and has reached its end of useful life. According to THESL’sasset condition assessment, the A4-5E switchgear has a Health Index of 43, indicating a poor health condition.

The switchgear enclosure was made of brick and mortar structures that serve as partitions between the circuit breaker cells. The existing circuit breakers are of the air-blast type and are obsolete. Moreover, a separate high-maintenance compressor air system is also required to operate the circuit breakers. Replacement parts are no longer being manufactured and all required parts need to be custom-manufactured, resulting in high maintenance costs and longer service times for repairs and returns. Similarly, the air-blast circuit breakers at this station also attract additional maintenance costs due to the added expense of renewing and maintaining the air supply system needed for breaker operation. Lastly, the switchgear is of a non-arc-resistant design and has an increased risk of collateral damage and personnel injury during an eventful failure.

The existing switchgear is to be replaced with 3000 A air-insulated, arc-resistant type C switchgear with double bus, double breaker configuration in order to improve equipment performance, system reliability and flexibility, and personnel safety.

Alternatives

Replacing the switchgear with gas-insulated switchgear rather than with air-insulated switchgear was considered as an alternative. However, due to the availability of floor space, the air-insulated switchgear was chosen as it has a lower capital cost and is easier to maintain.

Benefits

- Improves reliability due to the modern design of the enclosure that incorporates arc-resistance technology to prevent adjacent equipment from collateral damage
- Improves operational flexibility through the new double bus, double breaker configuration that would reduce outage time and maintenance cost
- Reduces the risk of failure by removing aged equipment and subsequently lowers potential risks on system reliability and outage

- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure that could build up inside the switchgear compartments as a result of arcing while personnel are inside the station
- Reduces maintenance costs and decreases the amount of time required for maintenance by utilizing vacuum circuit breaker technology as opposed to the air compressor system for circuit breaker operations
- Increases bus capacity ratings to meet future load growth given that the rating of the new switchgear is 72MVA compared to the existing switchgear rating of 36MVA and would be support any future load growth or load transfer requirements from neighbouring substations during contingency events

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would continue to rely on deteriorated switchgear that would increase the risk of failure, worsening system reliability and high maintenance costs associated with the air compressor system required for the operation of the air-blast circuit breaker. Deferral of this work would also increase safety risks to THESL personnel due to the absence of the arc-resistance design feature, and would limit THESL's capability to meet future load growth and transfers from adjacent station(s) in the event of an outage.

Portfolio: Stations

Project Title: Commission Strachan TS A11-12T Switchgear

Project Number: 21702

Project Year: 2013

Estimate Cost: $2,800,472

PROJECT DESCRIPTION

Objective:

The purpose of this project is to commission A11-12T switchgear at Strachan TS.

Scope:

The scope of work for this project is to commission the A11-12T switchgear that will replace the existing A7-8T switchgear in 2013. This project is a continuation of the 2012 project to replace the aforementioned switchgear.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	6 STRACHAN AVENUE
STATION(S)	STRACHAN TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The A7-8T switchgear was installed in 1956 and has reached the end of its useful life. According to THESL’s asset condition assessment, the A7-8T switchgear has a Health Index of 43, indicating a poor health condition. The existing circuit breakers are of the air-blast type and are obsolete. Moreover, replacement parts are no longer being manufactured and any required parts need to be custom manufactured, making the cost of maintenance high and the repair and return to service time long. The air-blast circuit breakers at this station also have additional maintenance costs due to the added expense of renewing and maintaining the air supply system needed for breaker operation. The switchgear is of a non-arc-resistant design and has an increased risk of collateral damage and personnel injury during an eventful failure. The new air insulated switchgear ("AIS") to replace A7-8T is to be purchased in 2012. This project involves the installation and commissioning of the new air-insulated switchgear.

Alternatives

New air-insulated switchgear is an alternative that was considered. However, the feasibility of this option is subject to investigation at detailed design stage, to determine if the existing space is adequate to accommodate the larger dimensions of the air-insulated switchgear.

Benefits

- Improves reliability due to the modern design of the enclosure that incorporates arc-resistance technology to prevent adjacent equipment from collateral damage
- Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability and outage risks
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Reduces maintenance costs and decreases the amount of time required for maintenance by utilizing vacuum circuit breaker technology as opposed to the air compressor system, for circuit breaker operations
- Increases bus capacity ratings to meet future load growth given that the rating of the new switchgear is 72MVA compared to the existing switchgear rating of 40MVA and

would support any future load growth or load transfer requirements from neighbouring substations during contingency events

IMPACT OF DEFERRAL

If this project were to be deferred, THESL will continue to rely on deteriorated switchgear that would increase the risk of failure, worsening system reliability and high maintenance costs associated with the air compressor system required for operation of the air-blast circuit breaker. Moreover, deferral of the A7-8T switchgear at Strachan TS would result in deferred replacement of the next switchgear A5-6T, and create a backlog moving forward. Lastly, deferral of this work would also increase safety risks to THESL personnel due to the absence of the arc-resistance design feature, and would limit THESL's capability to meet future load growth and transfers from adjacent station(s) in the event of an outage.

Portfolio: Stations

Project Title: Sonnet Upgrade OC-3 to OC-12

Project Number: 21348

Project Year: 2013

Estimate Cost: $930,853

PROJECT DESCRIPTION

Objective:

The purpose of this project is to upgrade the SONET fibre network from OC-3 to OC-12.

Scope:

The scope of work for this project is to upgrade the existing SONET JungleMux system from OC-3 to OC-12 to increase communication bandwidth and support automation of the distribution system.

DISTRICT	N/A
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Toronto Hydro uses SONET fibre optics, copper lines, radios and leased bell lines to perform various types of communications. The existing SONET JungleMux system also supports the SCADA system, as well as the security cameras that are being installed in various substations. The security cameras that are being installed in various stations take up significant bandwidth. The SONET system will also support various THESL automation initiatives that are currently underway or planned for the future. The existing SONET JungleMux system uses OC-3, which has a band-width of 155.52Mb/s. As such, the bandwidth of the existing OC-3 is approaching its full capacity and needs to be upgraded to OC-12 that has a bandwidth of 622.8Mb/s, in order to be able to accommodate the various types of communications being performed, including those carried out by the SCADA system to monitor and control various THESL distribution equipment.

Alternatives

An alternative to upgrading the SONET JungleMux, OC-3 system to OC-12 is to expand the existing copper communication lines; however, this alternative was not deemed to be cost-effective because fibre optic communication line is more cost effective than copper communication line.

Benefits

- Increases the efficiency of the SONET communication system
- Increases the capability to support current and future automation of the distribution system

IMPACT OF DEFERRAL

If this project were to be deferred, the OC-3 system will eventually reach its capacity, and controlling and monitoring of newly added equipment to THESL's distribution system will retard data communications. This would result in inefficiencies in the transfer of data to the Control Room through SCADA and a slower response when dispatching crews for trouble shooting outages.

Portfolio: Stations

Project Title: Replace Neilson Drive 4KV MS Switchgear

Project Number: 21581

Project Year: 2013

Estimate Cost: $865,420

PROJECT DESCRIPTION

Objective:

The purpose of the project is to replace the 4kV switchgear at Neilson Drive MS.

Scope:

The scope of work for this project is to replace the existing 4kV air-insulated switchgear with arc-resistant air-insulated switchgear at Neilson Drive MS.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	4237 BLOOR STREET WEST
STATION(S)	NEILSON DRIVE MS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The switchgear at Neilson Drive MS was installed in 1954 and has reached the end of its useful life. The circuit breakers that are fitted in the switchgear are oil circuit breakers and they are obsolete. The maintenance of oil circuit breakers is generally labour-intensive. There is also high risk of collateral damage during eventful failure of the oil circuit breakers that could lead to the loss of the entire switchgear, which in turn could result in outages to approximately 1,200 customers. Spare parts for the switchgear are no longer being manufactured; any spare part required is obtained in a special order at high cost, making the cost of maintenance equally high. The switchgear does not have the arc-resistant design and has an increased risk of collateral damage and personnel injury during an eventful failure. The project involves replacement of the existing switchgear with air-insulated arc-resistant type switchgear. This is in order to improve equipment performance, system reliability, and personnel safety as well as achieve operating cost reductions.

Alternatives

An alternative to switchgear replacement is to convert the area to higher voltage system and decommission the entire Neilson Drive station. Conversion to higher voltage is usually at higher cost and the long term existence of Neilson Drive MS is required to support adjacent station load during contingency. Therefore, replacement of Neilson Drive MS switchgear is the most economical and effective way to continue the power supply to customers.

Benefits

- Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability and outage risks
- Reduces the risk of low probability, high impact station events as failure of the existing oil circuit breakers could result in collateral damage in the substation
- Reduces associated maintenance costs through the replacement of oil circuit breakers where maintenance is labour-intensive compared to the vacuum circuit breakers
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Improves outage response times and lowers costs to operate the switchgear

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would face an increased risk of a supply outage to all or a portion of approximately 1,200 customers connected to the switchgear, in the event of a lengthy outage. Moreover, deferral of this work would also increase safety risks to THESL personnel due to the lack of the arc-resistance design feature, and would limit the capability to meet future load growth and transfers from adjacent station(s) in the event of an outage. Lastly, the costs to reactively replace the switchgear would be much higher and given that the lead time to procure and deliver the switchgear equipment ranges from 9-12 months; postponement of this work would result in unnecessary load pressure on adjacent stations.

Portfolio:	Stations
Project Title:	Replace Bermondsey TS 4 KSO Circuit Breakers
Project Number:	21656
Project Year:	2013
Estimate Cost:	$755,723

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the four KSO oil circuit breakers with vacuum circuit breakers at Bermondsey TS.

Scope:

The scope of work for this project is to replace the existing four, outdoor oil circuit breakers with vacuum circuit breakers connected to feeders 53M1, 53M3, 53M7 and 53M11 at Bermondsey TS.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	178 BERMONDSEY ROAD
STATION(S)	BERMONDSEY TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The outdoor oil circuit breakers at Bermondsey TS were installed in 1960 and have reached their end of useful life. The maintenance of oil circuit breakers is labour-intensive, as oil inspections and cleaning are required after every fault-clearing duty, on top of periodical maintenance. As a result of the high volume of oil in the circuit breakers, an eventful breaker failure can lead to significant collateral equipment damage and fire. Spare parts for the KSO oil circuit breakers are no longer being manufactured; any spare part required is obtained on special order at high cost, making the cost of maintenance high. Due to the potentially high risk of collateral damages, failure of an oil circuit breaker can cause an outage to the whole station, affecting approximately 10,800 customers connected to Bermondsey TS.

Benefits

- Increases system reliability due to the elimination of the aging, oil-filled circuit breakers
- Reduces the risk of low-probability high-impact station events due to the replacement of the oil-filled circuit breakers with vacuum circuit breakers
- Lowers maintenance costs by replacing the more labour-intensive oil circuit breakers with vacuum circuit breakers that require less maintenance
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would face an increased risk of a supply outage to all or a portion of approximately 10,800 customers connected to the Bermondsey TS in the event of an oil circuit breaker failure. This would subsequently result in a lengthy outage to the whole station due to collateral damage. Moreover, deferral of this work would also increase safety risks to THESL personnel due to the oil flammability of circuit breakers in an eventful failure.

Portfolio:	Stations
Project Title:	Replace Greencedar Lawrence MS Switchgear & Install SCADA/RTU
Project Number:	21338
Project Year:	2013
Estimate Cost:	$517,957

PROJECT DESCRIPTION

Objective:

The purpose of the project is to replace the switchgear and install SCADA/RTU at the Greencedar Lawrence MS.

Scope:

The scope of work for this project is to replace the existing 4.16kV air insulated switchgear with new arc-resistant air-insulated switchgear and install a new, remote monitoring and control system at Greencedar Lawrence MS.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	29 GREENCEDAR CIRCUIT
STATION(S)	GREENCEDAR LAWRENCE MS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The switchgear at Greencedar Lawrence MS was installed in 1961 and has reached the end of its useful life. The circuit breakers that are fitted in the switchgear are oil circuit breakers and they are obsolete. The maintenance of oil circuit breakers is generally labour-intensive. There is also high risk of collateral damage associated with eventful failure of the oil circuit breakers that could lead to the loss of the entire switchgear, which in turn, could result in outages to approximately 900 customers. Spare parts for the switchgear are no longer being manufactured; any spare part required is obtained on special order at high cost, making the cost of maintenance equally high. Greencedar Lawrence MS has no remote monitoring and control system. The THESL Controllers cannot remotely obtain real time information on the status of circuit breakers nor are they able to remotely operate the circuit breakers to reconfigure power flow during outages and/or planned work.

This project involves the replacement of the existing switchgear that has oil circuit breakers with switchgear fitted with vacuum circuit breakers.

Alternatives

An alternative that was considered was to decommission the station entirely. However, this alternative requires the distribution load served by the station to be converted to a higher voltage or to be transferred to neighbouring stations. Since this alternative was not feasible, it was ruled out as an option.

Benefits

- Reduces the risk of failure by removing aged equipment
- Reduces the risk of low probability, high impact station events as failure of the existing oil circuit breaker could result in collateral damage in the substation

- Reduces associated maintenance costs through replacement of oil circuit breakers where maintenance is labour-intensive compared to the new, vacuum circuit breakers
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Enables new, remote control and monitoring as well as increases operational flexibility as system operators would be able to manage outages and planned work more effectively

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would face an increased risk of a supply outage to all or a portion of approximately 900 customers connected to the switchgear, in the event of a lengthy outage. Moreover, deferral of this work would also increase safety risks to THESL personnel due to the lack of the arc-resistance design feature, and would limit THESL's capability to meet future load growth and transfers from adjacent station(s) in the event of an outage. Lastly, the costs to reactively replace the switchgear would be much higher and given that the lead time to procure and deliver the switchgear equipment ranges from 9-12 months, postponement of this work would result in unnecessary load pressure on adjacent stations.

Portfolio:	Stations
Project Title:	Replace Lawrence Golf T1 MS Switchgear
Project Number:	21804
Project Year:	2013
Estimate Cost:	$510,358

PROJECT DESCRIPTION

Objective:

The purpose of the project is to replace the switchgear at Lawrence Golf T1 MS.

Scope:

The scope of work for this project is to replace the existing 4kV air-insulated switchgear with new arc-resistant air insulated switchgear and install a new remote monitoring and control system at Lawrence Golf T1 MS.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	3782 LAWRENCE AVENUE EAST
STATION(S)	LAWRENCE GOLF MS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The switchgear at Lawrence Golf T1 MS was installed in 1956 and has reached end of its useful life. The switchgear is fitted with oil circuit breakers and they are obsolete. Spare parts for the switchgear are no longer being manufactured; any spare part required is obtained on special order at high cost, making the cost of maintenance equally high. The maintenance of oil circuit breakers is generally labour-intensive with a corresponding high maintenance cost. There is also high risk of collateral damage during eventful failure of the oil circuit breakers that could lead to the loss of the entire switchgear, which in turn could result in outage to a large number of customers. Lawrence Golf T1 MS has no remote monitoring and control system. THESL Controllers cannot remotely obtain real time information on the status of circuit breaker positions nor are they able to remotely operate the station to reconfigure it to restore power.

Alternatives

An alternative to rebuilding the station that was considered involved decommissioning the station entirely. However, this alternative requires the distribution load served by the station to be converted to a higher voltage or to be transferred to neighbouring stations. Since this alternative would result in much higher cost, it was rejected.

Benefits

- Increases system reliability due to the replacement of the aging equipment.
- Reduces risk of low-probability high-impact station events as a result of the elimination of the aging oil-filled circuit breakers
- Reduces operating and maintenance cost due to the replacement of the oil filled circuit breakers whose maintenance is labour intensive compared to the vacuum circuit breakers fitted in the new switchgear which require no maintenance.
- Increases personnel safety due to the elimination of the aging equipment, the arc-resistant feature of the new switchgear and the remote controlling system that is to be installed under this project
- Increases operational flexibility; the remote controlling system will enable system operators to manage outages and planned work more efficiently

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would face an increased risk of a supply outage to all or a portion of approximately 1,300 customers connected to the MS station, in the event of a lengthy outage. Moreover, deferral of this work would also increase safety risks to THESL personnel due to the lack of the arc-resistant design feature, and would limit THESL's capability to meet future load growth and transfers from adjacent station(s) in the event of an outage. Lastly, the costs to reactively replace the switchgear would be much higher and given that the lead time to procure and deliver the switchgear equipment ranges from 9-12 months, postponement of this work would result in unnecessary load pressure on adjacent stations.

Portfolio: Stations

Project Title: Replace Etobicoke MOSCAD RTUs

Project Number: 22806

Project Year: 2013

Estimate Cost: $509,042

PROJECT DESCRIPTION

Objective:

The purpose of the project is to replace the MOSCAD RTUs and MOSCAD DARCOM radios.

Scope:

The scope of work for this project is to replace 14 obsolete Motorola MOSCAD RTUs and MOSCAD DARCOM radios with new modern RTUs, as there is no longer technical support from the supplier.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The Motorola supplier informed THESL that Motorola will no longer provide technical support for the MOSCAD RTUs and DARCOM radios that were deployed at various locations in Etobicoke. Furthermore, Motorola will stop the production of the

IPGATEWAY, which is a major component used by the Master Radio Site. All spare parts are from limited sources of decommissioned stations. These parts may not be reliable and may be used up. In general, the MOSCAD RTUs were made in 1997 and the technology is no longer effective for present operations. The MOSCAD RTU uses MDLC proprietary communication protocol, whereas the new equipment will be equipped with a more modern DNP communication protocol. There are 71 stations and 164 pole tops in Etobicoke that are equipped with the MOSCAD RTUs and DARCOM radios. Accordingly, this project is one of a series of projects planned over a five-year window to replace the MOSCAD RTUs and DARCOM equipment, starting in 2012.

Alternatives

The status quo is not an option. Without replacements parts and technical support from the supplier, THESL will lose all SCADA communication to stations, thereby reducing operational effectiveness and increasing costs due to manual switching in the event of a failure.

Benefits

- Reduces the risk of losing SCADA monitor and control functions on MOSCAD RTUs
- Modernizes the system by replacing the MOSCAD RTUs with modern equipment and therefore decreases the risks of losing control of station equipment
- Reduces maintenance and operational costs associated with procuring parts, maintenance and troubleshooting support for the obsolete SCADA RTUs
- Increases operational flexibility by providing THESL Control operators with the ability to remotely control the switching of the circuit breakers

IMPACT OF DEFERRAL

If both DARCOM master radios fail, all SCADA functions in Etobicoke would be lost. System controllers would not be able to administer work protection via SCADA and response crew would have to be dispatched to the substation(s) to prevent the breaker(s) from reclosing. As a result, a two-minute operation could ostensibly become a two-hour operation. Furthermore, as the MOSCAD RTUs are ageing, deferral of this project could lead to increasingly more failures and would use up Protection and Control resources for repair.

PROJECTS $500K AND OVER FOR 2013

STANDARDIZATION PORTFOLIO

Table 1: Standardization Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
23590	Grounding Compliance Program	2.2
20939	FESI CSP Replacement (NY85M1)	1.5
19886	Replacement of CSP Transformers (YK35M10)	1.1
20023	Replacement of CSP Transformers (NY53M5)	1.0
23587	Porcelain Insulator Replacement Program	0.5
Total Cost		6.3

Portfolio:	Standardization
Project Title:	Grounding Compliance Program
Project Number:	23590
Project Year:	2013
Estimate Cost:	$2,200,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the grounding system of selected submersible transformer vaults and pole-mounted transformers across the system according to THESL currently approved construction standards. This program is required to ensure safe and proper operation of distribution system equipment, thus protecting workers and the public from potentially dangerous step and touch potentials in the event of a fault.

Scope:

The scope of work for this project is to rebuild the grounding system of about 444 submersible transformer vaults in the former distribution service area of Scarborough and 689 pole-mounted transformers within the downtown core and older system designs.

For a submersible transformer vault, each location would require the following: excavation around the vault; installing four ground rods, one at each corner; forming a ground loop around the vault; and bonding the loop to the existing ground grid inside the vault at two points. Similarly, for a pole-mounted transformer, each location would require the following: installation of a ground rod; upgrading any insufficient wire sizes and connectors; and bonding the transformer case, H2 ground connection and X2 terminal (when used as a ground point) separately to the system neutral.

DISTRICT(S)	TORONTO (SUBMERSIBLE), SCARBOROUGH (POLE-MOUNTED)
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

For submersible vaults, the grounding was investigated and identified to be insufficiently constructed as per current THESL grounding standards. Subsequently, the possible threat of step and touch potential has initiated upgrades of the existing grounding to comply with the Ontario Electrical Safety Code ("OESC") and THESL construction standards.

For pole-mounted transformers, improper grounding has been found where grounding connections were contained within one connector, contrary to THESL currently approved construction standards. Furthermore, the system ground to the ground rod has been compromised, which has created insufficient ground path to earth. These findings have given rise to an initiative to investigate the integrity of THESL pole-mounted transformer grounding systems and rectify related deficiencies.

Benefits

- Establishes a sufficiently low resistance path to earth
- Limits system voltage in fault conditions and ensures fuses and circuit breakers operate properly
- Increases safety of workers and the public

- Eliminates any non-conformance to THESL currently approved construction standards and Ontario Regulation 22/04

IMPACT OF DEFERRAL

Compliance with grounding requirements is critical, and deferral of this work would increase the risk of step and touch potentials exceeding safe levels for workers and the public. Moreover, deferral of this work would also affect THESL's ability to ensure proper arrester operation, and thus system protection. Proper arrester operation shunts excess current to ground, thereby protecting system assets from potentially damaging levels of energy. This operation also increases public safety by reducing the chances of catastrophic failure of equipment. Lastly, deferral of this work would interfere with THESL's ability to comply with Section 4 of Ontario Regulation 22/04 requirements to ensure that all metal parts of an installation not intended to be energized be effectively grounded.

Portfolio:	Standardization
Project Title:	FESI CSP Replacement (NY85M1)
Project Number:	20939
Project Year:	2013
Estimate Cost:	$1,520,063

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace CSP transformers, glass insulators and arrestors along feeder NY85M1.

Scope:

The scope of work for this project is to replace approximately 60 CSP transformers along feeder NY85M1 in the vicinity of Wilson Avenue with THESL standard transformers. It would also involve replacing 35ft. poles and associated non-compliant insulators, arrestors and fuse assets as identified in the field, with taller poles to meet the height requirements required for the standard transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WILSON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M1

JUSTIFICATION

Project Background

The project is to further harmonize the system through the proactive replacement of CSP transformers. Overall, CSP distribution transformers, fuse cutouts, as well as glass and/or porcelain switches and arrestors are legacy assets in the system. As such, they are contributing factors that have led to NY85M1 being one of the worst performing feeders in the system.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			169
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,596	178	341
Feeder CMO ***(Cumulative)***	181,878	22,483	110,225

Benefits

- Improves feeder reliability by reducing both outage duration and frequency, resulting in greater customer satisfaction
- Improves upon the worsening SAIDI trend over the last couple of years due to equipment-related outages
- Reduces foreign interference and improves reliability through the installation of animal guards and tree-proof conductors
- Provides an opportunity to alleviate stressed assets and improve grid operating conditions
- Reduces emergency and reactive capital and maintenance costs by removing

primary assets that are at or nearing the end of their service life

IMPACT OF DEFERRAL

If this project were to be deferred, THESL expects that the upward trend in CMO will continue and that outage durations either will remain at their presently high levels or increase, due to poor switching capability of CSP transformers. This would subsequently lead to higher reactive investment costs and customer dissatisfaction. Furthermore, if this work were to be deferred, THESL would lose the opportunity to address known legacy issues and modernize the distribution system in the area.

Portfolio: Standardization

Project Title: Replacement of CSP Transformers (YK35M10)

Project Number: 19886

Project Year: 2013

Estimate Cost: $1,054,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace CSP transformers, glass insulators and arrestors along feeder YK35M10.

Scope:

The scope of work for this project is to replace approximately 44 CSP transformers along feeder YK35M10 in the area bounded by Oakwood Avenue, Kirknewton Road, Hopewell Avenue and Rogers Road with the latest THESL standard transformers. It also involves replacing 35ft. poles and associated non-compliant insulators, arrestors and fuse assets as identified the field, with taller poles to meet the height requirements for the standard transformers.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	FAIRBANK
STATION(S)	FAIRBANK TS
FEEDER(S)	YK35M10

JUSTIFICATION

Project Background

The project is to further harmonize the system through the proactive replacement of CSP transformers. Overall, CSP distribution transformers, fuse cutouts, as well as glass and/or porcelain switches and arrestors are legacy assets in the system. As such, they are contributing factors that have led to YK35M1 being one of the worst performing feeders in the system.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			71
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			10
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	12,575	12,712	3,289
Feeder CMO ***(Cumulative)***	264,597	284,889	32,905

Alternatives

The alternative to proactively replacing CSP transformers is to allow them to run to failure and replace them during the outage. However, the customer would experience a longer than necessary outage, when compared to the work required to replace the transformer with a standard overhead transformer.

Benefits

- Improves feeder reliability by reducing both outage duration and frequency resulting in greater customer satisfaction

- Reduces the number of sustained interruptions experienced by the FESI-10 feeder
- Modernizes the system through the proactive replacement of CSP transformers and associated legacy equipment identified by THESL
- Significantly improves service reliability and customer satisfaction as a result of rebuilding the pole lines on the feeder
- Reduces emergency and reactive capital and maintenance costs due to significantly greater reliability

IMPACT OF DEFERRAL

By deferring this project, THESL would be unable to improve the reliability on this feeder that has a current FESI ranking of 10 and could possibly deteriorate further. In addition, THESL would continue to experience longer outages due to CSP equipment failures thereby negatively impacting customers in the area. Furthermore, if this work were to be deferred, THESL would lose the opportunity to address known legacy issues and modernize the distribution system in the area.

Portfolio: Standardization

Project Title: Replacement of CSP Transformers (NY53M5)

Project Number: 20023

Project Year: 2013

Estimate Cost: $958,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace CSP transformers, glass insulators and arrestors along feeder NY35M5.

Scope:

The scope of work for this project is to replace approximately 43 CSP transformers along feeder NY53M5 in the area bounded by Victoria Park Avenue, Bermondsey Road, Eglinton Avenue and Northline Road with THESL standard transformers. It also involves replacing 45 35ft. poles and associated non-compliant insulators, arrestors and fuse assets as identified the field, with taller poles to meet the height requirements for the standard transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WEXFORD
STATION(S)	BERMONDSEY TS
FEEDER(S)	NY53M5

JUSTIFICATION

Project Background

The project is to further harmonize the system through the proactive replacement of CSP transformers. Overall, CSP distribution transformers, fuse cutouts, as well as glass and/or porcelain switches and arrestors are legacy assets in the system. As such, they are contributing factors that have led to NY35M5 being one of the worst performing feeders in the system.

Alternatives

The alternative to proactively replacing CSP transformers is to allow the transformers to run to failure and replace them during the outage. However, the customer would experience a longer than necessary outage, when compared to the work required to replace the transformer with a standard overhead transformer.

Benefits

- Improves feeder reliability by reducing both outage duration and frequency resulting in greater customer satisfaction
- Reduces the number of sustained interruptions experienced by the FESI-10 feeder
- Modernizes the system through the proactive replacement of CSP transformers and associated legacy equipment identified by THESL
- Significantly improves service reliability and customer satisfaction as a result of rebuilding the pole lines on the feeder
- Reduces emergency and reactive capital and maintenance costs due to significantly greater reliability

IMPACT OF DEFERRAL

By deferring this project, THESL would continue to experience longer outages due to

CSP equipment failures, thereby negatively impacting customers in the area. Furthermore, if this work were to be deferred, THESL would lose the opportunity to address known legacy issues and modernize the distribution system in the area.

Portfolio: Standardization

Project Title: Porcelain Insulators Replacement Program

Project Number: 23587

Project Year: 2013

Estimate Cost: $520,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all existing porcelain insulators with polymer insulators in the overhead distribution system.

Scope:

The scope of work for this project is to replace about 400 porcelain insulators located across all of the former distribution service areas with polymer based materials. THESL will focus on replacing porcelain insulators for the following: worst performing feeders, other areas deemed to be under-performing such as older system configurations, and congested, heavily treed areas where the potential for failure is high and there may be associated public safety risks. The program is intended to supplement overhead projects where porcelain hardware is being removed.

DISTRICTS	TORONTO, NORTH YORK, SCARBOROUGH, ETOBICOKE, EAST YORK AND YORK
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Over the previous decade, porcelain has been phased out for new installations in favour of polymer based materials. Polymeric hardware offers several advantages over porcelain. Unlike polymeric hardware, porcelain forms water film on the surface that makes flashovers easier to occur, and has to be cleaned, washed and greased for maintenance purposes. Porcelain insulators are also susceptible to explosion and breakages due to their highly fragile properties. Moreover, hairline cracks can also develop in the porcelain that will lead to failure; these cracks generally cannot be seen from the ground. Lastly, porcelain can fail catastrophically, resulting in shards of jagged material being released into high-traffic areas. The resultant sharp-edged, damaged porcelain would then pose a safety hazard to workers working on or around this equipment.

Benefits

- Polymer insulators are compatible with tree-proof conductors that are designed to eliminate outages caused by tree contact, animal contact, short term phase-to-phase and phase-to-ground contact
- Lower tracking and leakage current would result in lower system losses
- Polymer insulators have superior mechanical strength, flexibility and are not susceptible to fragmentation
- Polymer insulators pose less of a safety concern in the event of a failure

IMPACT OF DEFERRAL

Deferral of this work would increase public and worker safety risks as porcelain insulators continue to deteriorate and fail at higher rates. When subjected to lightning or surge voltage stresses, porcelain insulators can puncture and subsequently break down completely, not only causing flashover between the energized element and the supporting structure, but may explode causing porcelain fragmentation in the process. Falling debris, jagged shards, pole fires and environmental risks are also associated with these aging assets. Finally, deferral of this work would also result in THESL losing this window of opportunity to effectively modernize the distribution system.

PROJECTS $500K AND OVER FOR 2013

DOWNTOWN CONTINGENCY PORTFOLIO

Table 1: Downtown Contingency Project

Estimate Number	Project Title	Estimated Cost ($ Millions)
19686	Dufferin - Wiltshire Feeder Tie A34W & A256DN	0.6
Total Cost		0.6

Portfolio: Downtown Contingency

Project Title: Dufferin - Wiltshire Feeder Tie A34W & A256DN

Project Number: 19686

Project Year: 2013

Estimate Cost: $644,902

PROJECT DESCRIPTION

Objective:

The purpose of this project is to facilitate interconnection(s) between Dufferin and Wiltshire stations, in order to improve operational flexibility and minimize the risks associated with station failure.

Scope:

The scope of work for this project is to decommission a transformer at Dupont MS that will result in a spare feeder, A34W at cell 23B, and use this feeder to tie A256DN. This project also includes cabling work that includes some feeder upgrading and swapping to alleviate operational concerns. Moreover, this project includes setup and switching to complete this component of the construction. As such, 10 poles will be installed along with 210m of overhead conductor and 625m of underground cable.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DAVENPORT & WILTSHIRE
STATION(S)	DUFFERIN TS, WILTSHIRE TS
FEEDER(S)	A34W, A256 DN

JUSTIFICATION

Project Background

In the event that Dufferin TS or Bridgman TS fails to supply power from the transmission level, there are no provisions for other feeders from adjacent stations to pick up the load. Specifically, on January 15th 2009, Dufferin TS was completely shutdown due to flooding caused by the firefighting system within the station. As it was not possible to transfer the station load to other stations, a total of 34,308 customers were affected, with some remaining without electricity for up to 24 hours on the coldest winter day of the year. As such, this project is one in a series of projects to provide back up for Dufferin station in the event of a station outage.

Benefits

- Ability to restore approximately 8 MVA following station outage via alternative supply
- Provides downtown contingency pick-up of approximately 8% of the total load at Dufferin station
- Operation staff will be able to restore within 14 hours all or partial loads from adjacent feeder ties in the event of a station failure. With future feeder automation this restoration can be reduced to within 1 hour

IMPACT OF DEFERRAL

If this project were to be deferred, THESL would continue to face the risk of a station outage that has the potential to impact a large volume of customers, as indicated in the above example at Dufferin Station in 2009. Deferral of this work could also impact THESL and its ability to supply the 19MVA of connected load, which could indirectly strain these facilities and cause subsequent collateral damage, should these stations face lengthy outages.

PROJECTS $500K AND OVER FOR 2013

STATIONS SYSTEM ENHANCEMENTS PORTFOLIO

Table 1: Stations System Enhancements Project

Estimate Number	Project Title	Estimated Cost ($ Millions)
22473	Bremner TS THESL Investments	31.9
Total Cost		31.9

Portfolio:	Stations System Enhancement
Project Title:	Bremner TS THESL Investments
Project Number:	22473
Project Year:	2013
Estimate Cost:	$31,942,051

PROJECT DESCRIPTION

Objective:

The objective of this project is to develop a new station, Bremner TS, to be located at Bremner Boulevard and Rees Street in downtown Toronto. The new station will provide the required capacity needed to facilitate staged replacements of end-of-life, air-blast switchgear at the existing Windsor TS, as well as provide additional capacity for anticipated load growth in downtown Toronto. The construction and commissioning of Bremner TS will take place over multiple project years.

Scope:

By the start of 2013, the Transformer Station building and the high voltage cable tunnel will be completed. The next steps for the project will be completion of the cabling work in the high voltage cable tunnel, installation of the major equipment and commissioning of the Transformer Station.

Cabling in the new high voltage cable tunnel will be run from the existing tunnel at the intersection of Front Street & Lower Simcoe Street to the Transformer Station. Moreover, within the new Transformer Station building, the 115kV switchgear, three 130MVA transformers, 13.8kV switchgear and all ancillary systems will be installed. All equipment will then be interconnected and the commissioning phase will be executed.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	SPADINA
STATION(S)	BREMNER TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Windsor TS was built in 1950 and expanded in 1968 and has since become one of the largest 13.8kV substations in Toronto. The 13.8kV air-blast switchgear, installed in 1956, is approaching its end of life and needs to be supplied from a new source. In addition, a new source is needed to reduce the overall loading levels at Windsor TS, as spare feeder positions are neither available nor is there room for additional switchgear. The supply to existing downtown customers also needs to be diversified to mitigate the effects of low-probability high-impact events such as fire or flooding. In addition, a significant new load of 90 MVA is anticipated in the coming years along the Toronto Waterfront area, as a result of the Waterfront Revitalization and East Bay Front Developments. Therefore, new capacity will need to be provided, ideally in the vicinity of the planned load increase to serve these new customers.

Alternatives

THESL considered the following alternatives before proceeding with the decision to build Bremner TS station: status quo, bus-to-bus load transfer and/or addition within Windsor TS. If THESL chose to remain with the status quo, THESL would need to have custom-made parts replaced and air supply systems rebuilt at significant cost. Subsequently, as there is no alternate supply to customers, switchgear failure at Windsor TS would have a major impact on the 55 MVA of existing load in the area, which includes many of the downtown business towers and the financial district. For the second option, it was determined that bus-to-bus load transfer or additions within Windsor TS cannot be supported as there is not enough bus capacity to support load growth, and it was also determined that there is insufficient physical space to accommodate additional capacity by way of new switchgear. The other alternative of transferring load onto existing, adjacent stations was not preferred as only two stations (Strachan TS and Esplanade TS) have space for the expansion required to provide the new capacity. Furthermore, both of these stations are physically removed from Windsor TS and its existing supply area. Thus, installation work for underground cables to pick up the Windsor TS feeders from these two stations would have to cross existing supply areas causing significant disruption due to construction along city streets.

Benefits

- Provides the required capacity needed to facilitate staged replacements of end-of-life air-blast switchgear at Windsor TS in the short-term
- Reduces overall loading levels at Windsor TS by diversifying customer supply and mitigates the impact of low-probability high-impact events in the long-term
- Reduces the risk of customer outages due to equipment failures
- Provides capacity relief to neighboring stations by enabling distribution load transfers to occur and provides increased capacity to accommodate the expected large-scale customer growth in downtown Toronto

IMPACT OF DEFERRAL

If this work were to be deferred, commissioning of the Bremner TS station would be delayed, thereby increasing the risk of a significant station outage due to the threat of failed equipment. By the end of 2012, THESL would already have committed significant funds on down payments to suppliers and contractors to initiate the work planned for 2013 and deferral of this work would effectively strand these funds. Finally, deferral of this work would also put the existing station at risk, as it would not be able to support the planned load growth in the downtown core.

PROJECTS $500K AND OVER FOR 2013

SECONDARY UPGRADE PORTFOLIO

Table 1: Secondary Upgrade Project

Estimate Number	Project Title	Estimated Cost ($ Millions)
23578	Contact Voltage Remediation	$12.2
Total Cost		**$12.2**

Portfolio:	Secondary Upgrade
Project Title:	Contact Voltage Remediation
Project Number:	23578
Project Year:	2013
Estimate Cost:	$12,200,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all metallic and non-standard handwell units with non-conductive, polymer handwell units, in order to remediate contact voltage issues. Since the program is intended to replace all identified non-standard handwell units across the THESL distribution system, the contact voltage remediation program will take place over multiple project years.

Scope:

The remediation work for 2013 continues to focus on the remaining areas outside of the downtown core, mainly North York, East York, Scarborough and Etobicoke. Also for this period, handwells that are located where a city moratorium expires in 2013 will also be remediated. Thus, THESL plans to replace approximately 2,100 handwells; the subset of handwells with expiring city moratoriums is anticipated to be 61 units.

Within the program, the scope of work for this project will involve excavation of the entire handwell assembly from the sidewalk and installation of the new standard of non-conductive, polymer concrete handwells. Additional scope items may include the following when encountered: repair of underground cable faults and the elimination of temporary overhead supply to street lighting; replacement of secondary bus cable in the handwells with dual protection cable; replacement of existing fuses with in-line waterproof fuses; and excavation and removal of abandoned handwells and odd-sized metal lids with non-conductive handwells.

DISTRICT(S)	NORTH YORK, EAST YORK, SCARBOROUGH, ETOBICOKE
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Secondary electrical plant installed in the field constantly is subjected to the elements of nature and the human environment. It endures water, salt and contamination ingress and wide variations in temperature. Corrosion and degradation of components occur and, eventually, the integrity of connections may deteriorate to a point where live electrical wires may become exposed. The result can be a contact voltage hazard to the public, which was the case in February 2009 when THESL declared a Level III emergency to secure all handwells and poles within the city in response to reports from the public of encounters with contact voltage. As a long-term response, THESL has initiated a program to replace metallic handwells with non-conductive handwells; specific secondary cables and connections are also being replaced.

Benefits

- Mitigates the risks of additional contact voltage incidents by addressing underground faults and connection issues
- Modernizes streetlighting connection standards

- Increases safety of the THESL secondary network through the installation of non-conductive polymer handwells and waterproof fusing
- Provides an opportunity to address abandoned handwells and non-standard lids

IMPACT OF DEFERRAL

Although contact voltage incidents are rare and typically isolated, deferral of this work would place THESL at risk of exposing the public to potentially unsafe equipment resulting in contact voltage incidents. As a result, THESL would face greater public scrutiny and added consequences if it were found to be non-compliant with Section 8 of Ontario Regulation 22/04. Moreover, the planned work for 2014 would then represent approximately 100% of the total handwells to be replaced over the period of 2012 to 2014. As such, deferral of this work would result in undue backlog that may become unsustainable due to operational or logistical concerns.

PROJECTS $500K AND OVER FOR 2013

EXTERNALLY INITIATED PLANT RELOCATIONS PORTFOLIO

Table 1: Externally Initiated Plant Relocations Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
23572	Dundas Street Underground Reconfiguration	3.3
23577	John Street Revitalization	1.0
Total Cost		**4.3**

Portfolio: Externally Initiated Plant Relocations

Project Title: Dundas Street Underground Reconfiguration

Project Number: 23572

Project Year: 2013

Estimate Cost: $3,330,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to work with the City of Toronto to beautify Dundas Street between Bathurst Street and University Avenue by relocating all overhead THESL infrastructure underground.

Scope:

The scope of work for this project is to remove approximately 75 poles along with the associated transformers and switches. 1,500 metres of new concrete-encased ducts will be required along with underground vaults for transformers and switches. To move the area underground, the area will also need to be converted from 4.16kV to 13.8kV, either on a radial or network system. Lastly, over 50 separate, customer connections will be required to relocate all infrastructures from overhead to underground.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DUNDAS WEST
STATION(S)	DEFOE MS
FEEDER(S)	B9DF

JUSTIFICATION

Project Background

The City of Toronto is working on a watermain replacement on Dundas Street West and has requested that all THESL infrastructures from Bathurst Street to University Avenue be relocated underground. As there will be a road moratorium once the watermain is completed, the City has requested that all THESL relocations be completed in 2013.

Alternatives

There were three main options reviewed for this project: maintain the existing overhead THESL infrastructure, relocate that infrastructure underground on a radial system or relocate the infrastructure underground as a network system. The City has informed THESL that it would prefer not to maintain the existing overhead infrastructure. Thus, in analyzing the two remaining alternatives, reconfiguration to a radial network would be more cost-effective, while reconfiguration to a network system would have a greater impact on system reliability. The final decision regarding radial versus network undergrounding has not been determined as of the date of this submission.

Benefits

- Maintains the current load configuration
- Provides an opportunity to increase system reliability
- Modernizes the system through elimination of the 4.16 kV feeder
- Contributes towards the City’s mandate of beautifying Dundas Street West

IMPACT OF DEFERRAL

If this work were to be deferred, THESL would miss the window of opportunity to complete construction before the road moratorium is put into effect. This would force THESL to remain with the existing overhead infrastructure until the moratorium is lifted, which is slated to occur around 2020. THESL would also lose the option to have portions of the costs recovered by the City under the cost sharing agreement.

Portfolio: Externally Initiated Plant Relocations

Project Title: John Street Revitalization

Project Number: 23577

Project Year: 2013

Estimate Cost: $979,020

PROJECT DESCRIPTION

Objective:

The purpose of this project is to accommodate the revitalization of John Street by relocating THESL infrastructure as required by the City of Toronto.

Scope:

The scope of work for this project is to relocate infrastructure that is in conflict with the City and its plans to revitalize John Street. THESL has over 1,000m of concrete-encased duct banks, 35 cable chambers and five vaults along John Street.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	THE GRANGE
STATION(S)	WINDSOR TS
FEEDER(S)	A65WR, A11WR, A9WR, A44WR, A99WR

JUSTIFICATION

Project Background

The City of Toronto is planning to revitalize John Street in its entirety. This will include reconfiguration of the existing layout, rebuilding the utility infrastructure and creating the City’s ‘red carpet’ for the Pan Am Games.

The City does not yet have detailed plans for the revitalization and the impact on THESL infrastructure is not fully known as of the date of this submission. As such, based on past experience, this project is based on the relocation and support of approximately 30% of all THESL infrastructures in the area.

Benefits

- Maintains the current customers and existing capacity supply
- Provides an opportunity to modernize the system and replace existing assets with new, supporting infrastructure as required

IMPACT OF DEFERRAL

If this work were to be deferred, it would negatively impact the completion of the John Street Revitalization, the City's 'red carpet' for the Pan Am Games in 2015. Additionally, for the street to be reconfigured by 2015, utilities will have to be relocated in 2013 to allow for the City's construction in 2014. Lastly, deferral of this work could also result in THESL losing this opportunity to better coordinate with appropriate utilities and agencies on infrastructure work and so minimize project related costs.