

From: [Van Overberghe, Ken](#)
To: Rodney.henry@jacobs.com; [Stall, Eric R](#); [Aguilar, Sergio](#); [Pioli, Christopher \(Christopher.Pioli@jacobs.com\)](mailto:Pioli.Christopher@jacobs.com); john.thorne@jacobs.com
Subject: 2016 Forecast - Rev B
Date: Thursday, November 20, 2014 8:28:41 AM
Attachments: [2016 Forecast Rev B redline.docx](#)

All,

Great meeting yesterday – thanks for your input.

Sergio and Eric – if anyone else needs to be ‘on-board’ (ex, Juan) with this before we finalize and issue to Integrys/PGL mgmt., now is the time to do it. This is ‘the program plan’ that we (PGL/PMO) are jointly putting forward..... I am available to walk though basis with whoever else we need to get up to speed.

Chris / John – we need to make sure that the 5 year and 2016 forecast are not in conflict. If you send me the latest copy, I will also put a set of eyes on it for consistency.

Per our discussion yesterday, attached are incorporated comments (not redlined) and new information added (redline) including

- Reference to AMRP
- Table depicting PTD, To-Go and Total quantities
- Adjustments to productivity for winter slowdown

There are a couple outstanding comments with large red arrows for closure including

- **Chris** – 5 Year plan document name and date
- **Sergio** – information for annual O&M and COSIPISE
- I will address disclosure

There are two info arrows for **Rodney**

- IDOT permit lead time (3 months)
- Winter SLOWDOWN for mains and services (no shutdown) – 50% productivity and number of crews reduced by 50%

Thanks

Ken VanOverberghe
Manager – Planning and Forecasting
Program Management Office
(d) 312.240.7770
(c) 773.447.2519
kvanoverberghe@peoplesgasdelivery.com

Capital Construction Program Forecast Year 2016

Peoples Gas and Light

Doc No. XXX.XXX.XXX

Disclaimer?[KJV1]

Approvers	Title	Signature	Date
W. Morrow	Exec. Vice President	DRAFT	/ /
J. Kleczynski	President, PGL		/ /
D. Giesler	Sr. Project Mgr		/ /
M. Zaglama	Program Director		/ /

Revision History

Date	Rev No	Originator	Action
11/20/14	B	K. VanOverberghe	Redline comments incorporated – issued for review
11/07/14	A	K. VanOverberghe	Issued for internal team review
10/27/14	DE	K. VanOverberghe	Draft Mark-up – not issued
09/25/14	DD	K. VanOverberghe	Draft Mark-up – not issued
08/21/14	DC	K. VanOverberghe	Draft Mark-up – not issued
07/21/14	DB	K. VanOverberghe	Draft report – conceptual review with client
07/14/14	DA	K. VanOverberghe	Draft Mock-up – not issued

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Executive Summary

Based on current analysis, the probabilistic (80%) schedule and cost information is

Program Completion: 3Q203X

Program Cost: \$X,XXX,X00,000

This represents a XX month change in schedule and \$X.X change in cost from the 2012 forecast.

Major drivers impacting overall cost and schedule include:

1. Intersection Restoration (Cost)
2. Meter Installation (Schedule)
3. Available Staff

Recommended actions to improve cost and schedule delivery include

1. Increase number of meter crews
2. Keep meter locations, relocate regulators

Assumptions, Inclusions and Exclusions

Cost and Schedule Basis

- Capital projects includes in the Accelerated Main Replacement Program (AMRP)
- Schedule is based on neighborhood prioritization outlined in (DOCUMENT NAME) dated XX/XX/XXXX[KJV2].
- Unit rates and productivity based on Program to Date (PTD) information and other criteria outlined throughout this document.
- Multiple schedule calendars to reflect specific needs including:
 - Weather calendar reflecting unusual events
 - Construction Central Business District (CBD) - As required (up to 7 days) / 8 hours / off shift (evening/weekends) with expected weather days
 - Construction (non CBD) – 5 days (M-F) / 8 hours / single shift (day) with expected weather days
 - Winter slowdown for mains and services from December 1 – March 31
 - City of Chicago – 12 holidays
 - Professional Services - 5 days (M-F) / 8 hours / single shift (day)
- Headcount for Union Locals 18007 (Gas Workers) and 597 (Pipefitters) will not increase from 2013 levels.
- Scope quantities as follows (services and meters may include some public improvement project quantities):



Component	PTD Actuals (10/14)	To-Go from 2015	Program Total
Mains (Retire miles) ^a	256	2,194	2,550
Mains (Install miles) ^a	525	3,025	3,550
Services (each) ^b	42,035	285,865	327,900
Meters (each) ^b	59,981	434,319	494,300
High Pressure (Install miles) ^c	6	33	39
Gate Stations ^c	0	2	2
PRS (Abandon) ^c	0	325	325
PRS (Install) ^c	0	41	41

a) Based on PGL GIS data (Oct 2014)
 b) Based on PGL GIS data (July 2014)
 c) Based on PGL DGIS data (Nov 2014)

Assumptions (Base Case Only)

- No anticipated improvement or degradation in existing City of Chicago (City) support for permits and OUC reviews.
- No significant City ordinance changes impacting delivery cost or schedule.
- Any federal, state and local agencies will provide necessary technical support to meet schedule.
- High Pressure (HP) line improvements in-place to support neighborhood priorities.
- Engineering IDIQ contracts for qualified firms in place for program duration and sufficient to advance program without delay.
- PGL review cycles for deliverables at 5-10 days. These are folded into the “Engineering Design” activities.
- Contractor interest and availability sufficient to support program without delay.
- All installation based on Design / Bid / Build delivery, by neighborhood with multiple phase/packages.

- Productivity and/or cost factored for specific construction complexity of a neighborhood as outlined in Modifiers section.
- Carryover of in-process 2015 work into 2016 based on the following 2014/2015 information:
 - Mains / Intersections – 15% of quantity
 - Services – 33% of quantity
 - Meters – 58% of quantitiesAssociated permit costs were included.
- Parallel mains (i.e., 'double decking') in neighborhoods / areas determined utilizing in-place main to retire..
- The size of existing main in-place used to determine size of new replacement main.
- The size of new replacement main determined preliminary line-of-lay based on the following criteria:
 - < 6" - 100% parkway installation
 - 6" – 30% roadway installation, 70% parkway installation
 - 8" – 50% roadway, 50% parkway installation
 - >8" – 100% roadway installation
- All mains installed utilizing cut and cover methodology. All services installed utilizing directional boring.
- No mains installed in alleys.
- Main and service installations include one temporary and final restoration.
- All live gas work performed by PGL crews.
- Any Right of Way (ROW) fees associated with Class 1 rail interface included in rail crossing costs.
- Third Party Engineering firms will secure all Right of Entry permits for rail road crossings.
- All deep shoring for rail road crossings will be at 12' except Union Pacific crossings (25'). Other deep shoring requirements based on current GIS information in PGL system.
- IDOT permits at no cost to program.
- Road intersections restoration costs based on 80% full intersections, 20% tee intersections.
- Estimate basis and minimum/maximum considerations include allowances for unknowns within the known scope – productivity and cost issues experienced from time-to-time on the program to-date.
- All piping, valves and other permanent materials associated with the delivery of gas provided by PGL.
- General Conditions are included in the unit rates.
- Weather protection and any temporary structures, excluding deep shoring, included in the unit rates utilized in the estimate.
- 'In-Service' milestones based on the following:
 - Mains – 2 weeks prior to main installation completion
 - Services – 6 weeks after service installation commences

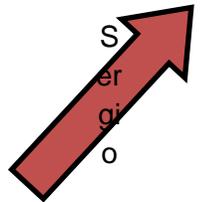
Exclusions

- Specific neighborhood COSIPISE (COrrosion, System Improvement, Public Improvement, System Expansion) projects unless noted otherwise.
- PGL activities after project close-out.

- Cost and schedule for any special permits (EIS, 401/404, water, harbor, etc.,) required to complete the program.
- Environmental design or remediation activities associated with specific projects.
- Cost and schedule for any special right of way agreements other than Class 1 rail.
- Cost for any right of way acquisition.
- Fees and/or Right of Entry approvals associated with work in proximity of CTA
- Any current or future taxes associated with the program including but not limited to material, services or execution.
- Citations, penalties or other similar fines associated with the program.
- Excessive unknown subsurface conditions, significant repairs to utilities damaged during main installation and other similar costs and schedule impacts.
- Restoration cost sharing / banking associated with specific joint project MOUs between PGL and other utilities.
- Deep shoring associated with installations other than rail road crossings.

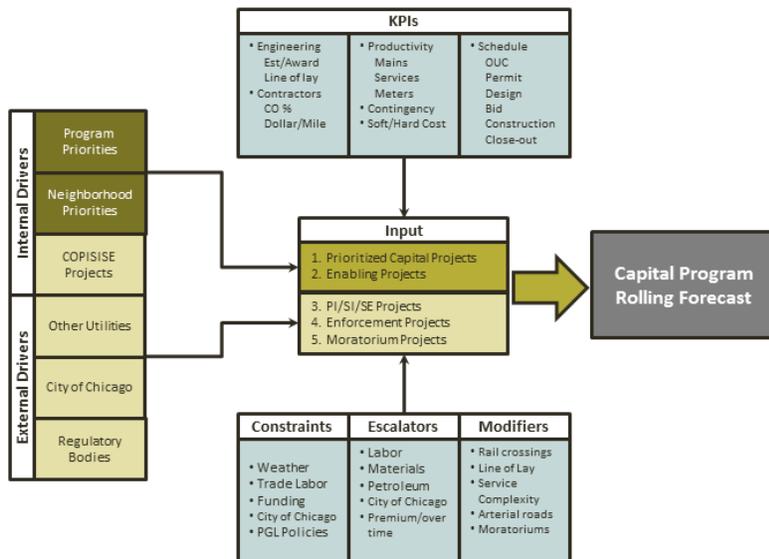
Inclusions

- Annual COSIPISE [KJV3] projects included as an annual LOE activity (120 projects / 35 miles).
- Annual O&M included as an LOE activity.
- PGL and Program Management Office Soft Costs included as an annual LOE activity.
- Temporary restorations associated with specific events (winter slow down, Chicago Marathon, etc.,).
- Winter slowdown for main and service work from Dec 1 – March 31, including productivity adjustments.



Program Overview

Program Drivers



Internal

Program

The program includes key components addressing Illinois Commerce Commission (ICC) safety related issues. These drivers are:

- Expansion of intra-station pipeline
- Replacement of low-pressure (LP) mains and associated service lines
- Replacement of medium-pressure (MP) cast-iron / ductile-iron (CI/DI) mains and associated service lines
- Retirement of MP to LP pressure regulator stations
- Installation of HP to MP pressure regulator stations
- Addition of new City Gate (gas measurement and pressure regulator) stations

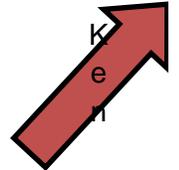
In addition, unrepaired leaks, low pressure 'islands', inside meters and damage prevention are within the parameters of the capital program.

Work within the capital program is executed through a combination of internal PGL resources such as engineering and gas workers (North, Central or South District) as well as outside parties (third party engineering consultants and construction firms).

Neighborhood Priority

Neighborhoods were ranked based on several key components, including applicable Distribution Integrity Management Program (DIMP) criteria. The criteria included CI/DI mains by size and age, unrepaired leaks, inside meters and vulnerable services. These were further adjusted to reflect a balanced workload in the various Districts to maximize replacement activities within the existing system.

A map and complete table [KJV4] of neighborhood priorities are included in Appendix A and B respectively. Select neighborhoods were combined with others for constructability. The neighborhoods were further assessed for construction complexity based on the Modifiers outlined later in this report.



COSIPISE Projects

From time to time, PGL may want or be required to relocate gas main facilities due to other infrastructure improvements, such as viaduct lowering, sewer and water improvements, redevelopment, etc. Whenever possible, PGL expects to leverage COSIPISE projects to:

- Make system improvements.
- Replace mains in advance of moratorium of resurfaced streets.
- Share restoration costs.
- Minimize customer inconvenience.
- Reduce in 3rd party damage to gas mains.

External

Other Utilities

One of the other utilities in the City may initiate their own improvement project which impacts PGL. In such cases, PGL may accelerate or reprioritize specific projects to complete their required work in conjunction with the other utility. This work is typically performed as a COSIPISE project.

City of Chicago

Like the other utilities, the City may initiate an improvement project such as a resurfacing or system upgrade where it makes sense for PGL to reprioritize or accelerate a portion of their work to support the greater good of minimizing impact on the residence and stakeholders. Additionally, through City requirements, moratoriums on select projects may be in place on roads or hardscapes which have recently been complete.

Regulatory Agencies

Various regulatory agencies drive the direction of select aspects of the program based on Federal and State requirements in place governing the efficient, safe and reliable delivery of gas to the public.

Key Performance Indicators

Select Key Performance Indicators (KPIs) driving cost and schedule of the program are incorporated into the annual forecast. While the KPIs listed are not the completely exhaustive list of dashboard indicators in-place to monitor the program, these were incorporated into the forecast. Over time, this list will be refined, with KPIs rolling on and off the list.

Item	Unit	Baseline	Forecasting Factor Range
Project Feasibility / Phasing	SPI	New KPI	0.90 – 1.20
IR average review cycle	Days	30	20-45
3 rd Party Engineering Design	CPI / SPI	New KPI	SPI: .90 - 1.30 CPI: See Est. Basis
EFP approval average review cycle	SPI	New KPI	20-45
Permit – average cycle	Days	5	5-15 days
Bid to NTP – average cycle	SPI	New	.75 – 1.50
Line of Lay rework (capital projects)	%	10%	10%
Main Installed	miles/wk/crew	.10	See Estimate
Services Installed	services/wk/crew	By Shop	See Est. Basis
Meters Installed	meters/wk/crew	By Shop	See Est. Basis
Restoration (intersections)	inter / wk / crew	.17	.13 - .24
COR / Hard costs	%	15%	By Activity Type
Soft Cost / Hard Cost	%	15%	15%
Cost / Mile – Main	\$ (thru 2013)	\$893K	
Cost / Service	\$ (thru 2013)	\$4,300	
Total Cost / Mile	\$ (thru 2013)	\$1.3M	

Constraints

Constraints are elements with limitations that affect the schedule and cost of specific activities and the program as a whole. The following are the major constraints included:

- Weather - Meteorological events (rain, snow, etc.) that may impact select activities within the schedule. Basis for constraint parameters is the National Weather Service Weather Office historic data for Chicago from 1964-2013¹ The chart below identifies adjustments built into the schedule to account for unusual events:

Probability of Event	Snow			Both	Rain						Snow	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
> Avg	14%	16%	16%	14%	16%	18%	14%	16%	14%	16%	18%	18%
< Avg	16%	18%	10%	18%	20%	18%	14%	10%	4%	12%	24%	18%
Schedule Adjustment Parameters												
Days	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

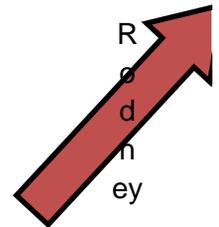
¹ Data for analysis found at http://www.crh.noaa.gov/lot/?n=ord_rfd_monthly_yearly_normals. Annual snow and rain accumulations were assessed. Unusual event identified as anything outside a standard deviation of the rolling 50 year average.

Max	3	3	3	3	3	2	2	2	2	3	2	3
Min	-3	-4	-2	-4	-3	-2	-2	-1	-1	-2	-3	-3

- Winter Slowdown – A significant portion of work is slowed down during the winter season starting in December and going through March.
- Trade Labor – Trade labor availability that may constrain critical program specific activities. Primary focus is on craft availability in Gas Workers Union - Chicago Local 18007 and Pipefitters Union Local 597.
- Funding – Capital Construction Program spending was uncapped.
- City of Chicago Permitting – A number of permits are required for the complete installation and retirement of a section of pipe main. The chart below outlines permit and requirements:

Permit Type	Criteria	Valid for
Main Installation (inc. restoration)	one per block	90 Days
Restoration (sod/asphalt)	one per every 6 blocks	30 Days
Restoration (intersections)	one per every 10 handicap ramps	30 Days
Retirement – per block	one per every 10 openings (1,500 ft of retired main)	30 Days
IDOT[KJV5]	one per impacted intersection	180 days

- Gas Cut-Off policy - Peoples Gas and Light’s policy is that no gas disconnects will be performed from November through April.
- Qualified contractors – The number of available local contractors to perform this specialized work is limited.



Escalations

Escalations are changes in the cost of specific goods and services over the life of the program based on industry trends.

- Labor – Gas Workers Union, Chicago Local 18007’s current contract² was used as a surrogate for all craft labor associated with the Capital Construction Program. Labor was escalated at 3.25% for 2016 and 3.50% for 2017 and 2018. Labor for the balance of the program was escalated at 3.25% and will be adjusted after the 2018 labor agreement is place.

Professional services (soft costs) were escalated at 3% per annum for the duration of the program.

² Contract located on the local’s website at www.gasworkers.org.

- Material – Material costs were evaluated based on Engineering News Record (ENR) US Historical Material Price Index from 1983 – 2012³. This is a composite of a variety of materials, many of which are not the primary components of the program. Over this 29 year period, material costs increased an average year over year (YoY) by 2.1%.

The Bureau of Labor Statistics Producer Price Index (BLS PPI)⁴ for Ready-Mix Concrete (NASIC 327320) was evaluated from a 25 year period between 1988 and 2013. Over that time, the average YoY increase was 3.0%.

Asphalt / PE Pipe (Petroleum) - The BLS PPI was evaluated for pricing volatility associated with petroleum based products used in the program. Data for plastic gas pipe and fittings (NASIC 326122) was limited to 2001-2011, with wide YoY swings (-18.5% to +19.0%). Over this short period, the average year over year change was -2.5%. For planning period 2016-2021, no change for PE pipe material will be incorporated into the analysis. Out years will include a 2% increase.

Asphalt paving material (NASIC 32412) was evaluated from 1988 – 2013. Several YoY spikes occurred in the 25 year evaluation period (19% and 22%). When removed, the average year over year increase averaged 2.9%, versus 4.3% when the aforementioned spikes are included.

The following weighted material escalation percentages were used.

Material	Percent Split of Material	Escalation	
		2016-2021	2021 - End
PE Pipe	18%	0.0%	2.0%
Asphalt	37%	2.9%	4.3%
Concrete	37%	3.0%	3.0%
Other	8%	2.1%	2.1%
Total (100%)	100%	2.4%	3.2%

This escalation is consistent with trends outlined in January 2014 Handy Whitman North Central Region update⁵.

Permanent material accounts for ~50% of the Total Construction Cost (TCC) of the program, with the balance being labor, equipment and spoils.

- City of Chicago – A number of ordinances increased the overall cost and schedule of the program, including intersection paving, ADA requirements and parking fees. These increases are built into the capital cost budget for the respective project. No other changes are included.
- Premium / Shift differential –Work in the Central Business District (CBD) performed at off-peak hours to minimize impact on businesses and traffic.

³ On-line resources for ENR located at www.enr.construction.com/economics/

⁴ On-line resources for the Bureau of Labor Statistics located at www.bls.gov in the Producer Price Index Industry Data query tool.

⁵ Handy Whitman index is a nationally recognized aggregate indicator of regional utility construction costs.

Modifiers

Modifiers are specific characteristics adding to the complexity of a project that impact the overall cost and schedule.

- Roadway : Parkway Installation (line of lay) – Productivity and cost basis for a neighborhood was adjusted based on the estimated roadway:parkway ratio as compared to the program-to-date baseline information for completed neighborhoods. Higher roadway percentage increases cost and schedule.
- Rail Crossings⁶ (number of crossings, volume of traffic) – Significant lead time is required in coordinating with the railroads. These typically require additional right of access, off peak work hours and significant temporary excavation design that increase the cost and duration of these projects.
- Meter and Service Complexity – Productivity adjustment based on the key characteristics of the service / meter installation including:
 - Meter location - inside/outside
 - Meter location inside – basement or other location
 - Finished or unfinished basement
 - Size of meter
 - Single family or multi-family dwelling⁷
 - Age of facility⁸
 - Shut off valve
- Residential / Commercial facilities (percentage)⁹ – Higher residential factors increase overall duration due to enhanced coordination and customer non-responsiveness on key activates requiring their authorization / approval. Cost and schedule increased due to multiple mobilization cycles.
- Arterial and Collector roads¹⁰ (percentage) – Arterial and Collector road percentage increases costs and duration due to additional permitting requirements (IDOT) and detailed maintenance of traffic issues, especially for detours.
- Road Moratorium¹¹ / Total Miles (percentage) – High percentages of moratorium projects require increased Ward coordination with the neighborhood and a premium cost for work prior to moratorium expiration. A moratorium factor of either: (a) current percentage, or; (b) average for City of Chicago (currently 36%) was applied to every neighborhood.

⁶ Volume of rail traffic (passenger and freight) found at www.cmap.illinois.gov/documents/

⁷ Based on information from the US Census Bureau found at www.factfinder2.census.gov

⁸ ibid

⁹ ibid

¹⁰ Information on Arterial and Collector roads found at www.gettingaroundillinois.com

¹¹ Based on City of Chicago information at www.cityofchicago.org

Program Cost and Productivity Basis

Program Unit Cost Basis

Mains + Restoration, No Intersections

Material Factor - Pipe: 10% of average sub-total - by pipe size

Category	Install or restore	Main Installation Pricing - LF of open cut*								
		2" Pipe			4" Pipe			6" Pipe		
		Road	Parkway	Alley	Road	Parkway	Alley	Road	Parkway	Alley
Labor/Equip	Install	\$17.50	\$17.50	\$17.50	\$20.00	\$20.00	\$20.00	\$29.50	\$29.50	\$29.50
Sand Backfill and Disposal	Install	\$11.50	\$17.00	\$11.50	\$11.50	\$17.00	\$11.50	\$11.50	\$17.00	\$11.50
Pavement Removal	Restoration	\$38.00	\$0.00	\$38.00	\$38.00	\$0.00	\$38.00	\$38.00	\$0.00	\$38.00
8" Alley Replacement	Restoration	\$0.00	\$0.00	\$244.50	\$0.00	\$0.00	\$244.50	\$0.00	\$0.00	\$244.50
12" Base	Restoration	\$61.50	\$0.00	\$0.00	\$61.50	\$0.00	\$0.00	\$61.50	\$0.00	\$0.00
Grinding & Resurfacing	Restoration	\$105.00	\$0.00	\$0.00	\$105.00	\$0.00	\$0.00	\$94.50	\$0.00	\$0.00
Topsoil	Restoration	\$0.00	\$6.00	\$0.00	\$0.00	\$6.00	\$0.00	\$0.00	\$6.00	\$0.00
Sod	Restoration	\$0.00	\$5.00	\$0.00	\$0.00	\$5.00	\$0.00	\$0.00	\$5.00	\$0.00
Sub Total		\$233.50	\$45.50	\$311.50	\$236.00	\$48.00	\$314.00	\$235.00	\$57.50	\$323.50
Pipe		\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.50	\$14.50	\$14.50
Total		\$247.50	\$59.50	\$325.50	\$250.00	\$62.00	\$328.00	\$249.50	\$72.00	\$338.00

Category	Install or restore	Main Installation Pricing - LF of open cut								
		8" Pipe			12" Pipe			>12" Pipe		
		Road	Parkway	Alley	Road	Parkway	Alley	Road	Parkway	6" Alley
Labor/Equip	Install	\$40.50	\$38.50	\$38.50	\$54.00	\$54.00	\$54.00	\$69.50	\$69.50	\$69.50
Sand Backfill and Disposal	Install	\$14.50	\$17.00	\$11.50	\$17.00	\$25.50	\$11.50	\$17.00	\$25.50	\$11.50
Pavement Removal	Restoration	\$42.50	\$0.00	\$38.00	\$47.50	\$0.00	\$38.00	\$47.50	\$0.00	\$38.00
8" Alley Replacement	Restoration	\$0.00	\$0.00	\$244.50	\$0.00	\$0.00	\$244.50	\$0.00	\$0.00	\$244.50
12" Base	Restoration	\$69.00	\$0.00	\$0.00	\$76.50	\$0.00	\$0.00	\$76.50	\$0.00	\$0.00
Grinding & Resurfacing	Restoration	\$97.50	\$0.00	\$0.00	\$90.00	\$0.00	\$0.00	\$90.00	\$0.00	\$0.00
Topsoil	Restoration	\$0.00	\$6.00	\$0.00	\$0.00	\$8.00	\$0.00	\$0.00	\$8.00	\$0.00
Sod	Restoration	\$0.00	\$5.00	\$0.00	\$0.00	\$6.50	\$0.00	\$0.00	\$6.50	\$0.00
Sub Total		\$264.00	\$66.50	\$332.50	\$285.00	\$94.00	\$348.00	\$300.50	\$109.50	\$363.50
Pipe		\$15.50	\$15.50	\$15.50	\$17.00	\$17.00	\$17.00	\$18.00	\$18.00	\$18.00
Total		\$279.50	\$82.00	\$348.00	\$302.00	\$111.00	\$365.00	\$318.50	\$127.50	\$381.50

*CBD rates = ((Subtotal x 52%) x 2.0) + (Subtotal x 48%). This equates to double time labor plus material

Services + Restoration

Material Factor - Pipe: 10% of average sub-total - by method

Category	Install or restore	Service Install - Per LF		
		5/8" - 1 1/4" Pipe		
		Direct Bore		Open Cut*
Labor/Equip	Install	\$26.50		\$17.50
Sand Backfill and Disposal	Restoration	\$14.50		\$56.50
Sidewalk	Restoration	\$3.00		\$17.00
Top Soil	Restoration	\$1.00		\$2.00
Sod	Restoration	\$0.50		\$2.00
Post Install Insp.	Install	\$5.50		\$5.00
Sub Total		\$51.00		\$100.00
Pipe		\$14.00		\$14.00
Total		\$65.00		\$114.00

* assume 2" sidewalk open cut numbers

Intersection Restoration

Category / Unit	Install or restore	Service Install - Per LF					
		Full Intersection			T Intersection		
		Qty	Price	Total	Qty	Price	Total
Labor/Equip (sf)	Restoration	3,448	\$4.50	\$15,516	2,780	\$4.50	\$12,510
Pavement Removal (sf)	Restoration	3,448	\$2.50	\$8,620	2,780	\$2.50	\$6,950
Grind / Resurface (sf)	Restoration	3,448	\$0.50	\$1,724	2,780	\$0.50	\$1,390
Handicap Ramps (ea)	Restoration	8	\$8,500	\$68,000	6	\$8,500	\$51,000
Total			\$7.50	\$93,860		\$7.50	\$71,850

Permits

Permit	Annual Escalation	Per opening	Asphalt Restoration Fee	Moratorium Degradation Costs*		
				Permit	0-2	2-5
Street / Alley	5%	\$432	Applicant must restore	\$864	\$5,000	\$2,500
Sidewalk	5%	\$432	No Charge	\$864	\$5,000	\$2,500
Parkway	5%	\$215	No Charge	\$430	\$5,000	\$2,500
ADA ramp Installation	5%	\$432	No Charge	\$864	\$5,000	\$2,500

Source: CDOT 2014 Permit Fee Schedule

* Depends of formula

Productivity / Cost parameter Basis

Engineering

No base case

Install Miles	PGL Review / submittal*	Productivity (miles / week)		
		Low	Base	High
< 2	5 wks	0.50	0.50	0.60
2 - 5	5 wks	0.50	0.75	0.85
5 - 8	5 wks	0.75	1.00	1.10
> 8	5 wks	1.00	1.25	1.35

* ~1 week / submittal / group, though some reviews periods are sequential

No base case

Install Miles	Cost Parameters*		
	Low	Estimate	High
< 2	7.6%	8.0%	8.8%
2 - 5	5.2%	5.5%	6.1%
5 - 8	4.3%	4.5%	5.0%
> 8	3.8%	4.0%	4.4%

*as percentage of mains and service construction cost

Permits

No base case

Permit location	Productivity		
	Low	Base	High
Street / Alley	1.00	1.00	3.00
Sidewalk	1.00	1.00	2.00
Parkway	1.00	1.00	2.00
ADA ramp Installation	1.00	1.00	2.00

Street requires two submittals. Low factor assumes inconsistent release of permits by City.
 ADA permits = (intersection x 4 adas)/10 adas per permit
 Source: PGL Permit Coordinator

No changes in permit costs beyond escalation

Cost Parameters		
Low	Estimate	High

100% 100% 130%
 10% of permits need extensions / re-application
 Parking and other misc requirements included

Mains + Final Restoration - No Intersections

Base Case - 2012-2014 Historic Information

Main Location		Productivity (mile / week)		
Road (MBR)	Parkway (MBP)	Low (PBL)	Base (PBB)	High (PBH)
35.6%	64.4%	0.75	1.00	1.27

Criteria for specific neighborhood productivity
 where: Main Location - Neighborhood Road = MNR
 Productivity - Neighborhood Base = PNB
 Productivity - Neighborhood High = PNH
 Productivity - Neighborhood Low = PNL

PNB = (MBR / MNR)*PBB Capped at 1.15
 PNH = PNB * (PBH / PBB) Capped at 1.30
 PNL = PNB * (PBL / PBB) Bottom 0.68

Source: PGL FMDR Database

Base Case - 2008 Historic Information from original model

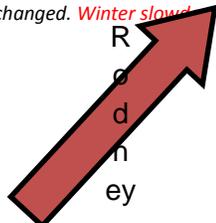
Cost Parameters		
Low	Estimate	High

95.0% 100.0% 120.0%

Source: Original 5 Yr Plan Main Estimating sheet

Productivity drops .01 (base,high) for every neighborhood if the number of neighborhoods exceeds 10 in any given year. Low factor remains unchanged. *Winter slowdown based on 50% productivity*

Cost Parameters increase 1% (estimate ,high) for every neighborhood above 10 if the number of neighborhoods exceeds 10 in any given year.



Services + Final Restoration

Base Case - 2012-2014 Historic Information

Shop	Productivity (services / week)		
	Low	Base	High
North	28.00	37.00	40.00
Central	24.00	32.00	35.00
South	30.00	40.00	44.00

Source: 2014 YTD Actuals

Productivity drops .01 (base,high) for every neighborhood if the number of neighborhoods exceeds 10 in any given year. Low factor remains unchanged. *Winter slowdown based on 50% productivity.*

Base Case - 2008 Historic Information from original model

Cost Parameters		
Low	Estimate	High
97.5%	100.0%	105.0%

Source: Original 5 Yr Plan Services Estimating sheet

Cost Parameters increases 1% (estimate ,high) for every neighborhood above 10 if the number of neighborhoods exceeds 10 in any given year. .

Intersections

Base Case - 2014 YTD Information

Ramps installed through 08/14	806.0
2 ramps/installation (ie, corner)	1,612.0
Avg ramps/Intersection	7.6
Full intesections (8 ramps)	80%
Tee Intersections (6 ramps)	20%
Total Intersections	212.1
through 34 weeks	
Intersection per week	6.2
Avg Crews/week August	36.4
Avg intersections/week/crew	0.17

Cost Parameters		
Low	Estimate	High
98.8%	100.0%	102.5%
75/25	80/20	90/10
\$88,400	\$89,500	\$91,700

Full:Tee Ratio

Productivity (Int/week)		
Low	Base	High
0.13	0.17	0.24

High / Low calculated based on 7 weeks of crew size information

Source: Restoration tracking spreadsheet, Weekly Report

Meters

PTD Information - 2013

Meter Location	Sub-Location	Dwelling Size	Meter Size	Productivity (days/meter)		
				Facility Age		
				>1981	40 - '80	<1940
Outside	N/A	N/A	Small	0.17	0.17	0.17
Outside	N/A	N/A	Medium	0.20	0.20	0.20
Outside	N/A	N/A	Large	0.25	0.25	0.25
Inside	Unfin Base	Single	Small	0.18	0.23	0.25
Inside	Unfin Base	Single	Medium	0.20	0.25	0.27
Inside	Unfin Base	Single	Large	0.25	0.32	0.33
Inside	Fin Base	Single	Small	0.36	0.45	0.50
Inside	Fin Base	Single	Medium	0.40	0.50	0.53
Inside	Fin Base	Single	Large	0.50	0.63	0.67
Inside	Other	Single	Small	2.00	2.50	2.63
Inside	Other	Single	Medium	2.00	2.50	2.63
Inside	Other	Single	Large	3.30	4.20	4.30
Inside	Unfin Base	Multi	Small	0.18	0.23	0.25
Inside	Unfin Base	Multi	Medium	0.20	0.25	0.27
Inside	Unfin Base	Multi	Large	0.25	0.32	0.33
Inside	Fin Base	Multi	Small	0.36	0.45	0.50
Inside	Fin Base	Multi	Medium	0.40	0.50	0.53
Inside	Fin Base	Multi	Large	0.50	0.63	0.67
Inside	Other	Multi	Small	2.00	2.50	2.63
Inside	Other	Multi	Medium	2.00	2.50	2.63
Inside	Other	Multi	Large	3.30	4.20	4.30

Cost/Schedule Parameters		
Low	Base	High
91.0%	100.0%	104.0%

Productivity estimated on PTD through 2013 based on mix of meters installed to achieve a 28 meter / day average.

Estimated split of Contractor and PGL work

Provider	Mains	Services	Meters
Contractors	89%	84%	0%
PGL / Company	11%	16%	100%
Total	100%	100%	100%

From 2014 Liberty Audit, Data Request (DR) 224h. Based on dollars.

Installation crew make-up

Craft Labor (FTEs)	Mains	Services	Meters
Operating Engineers	1	1	0
Laborers	2	2	0
Pipefitters	7	7	0
Gas workers	0	0	2
Total Crew Size	10	10	2

5 Year Plan (2016 – 2021) – Level II

SCHEDULE