HYDRO OTTAWA PLANT RELOCATION DESIGN CONSIDERATIONS FOR CITY OF OTTAWA STAFF

Design Supervisors

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AGENDA

- Information Required by Hydro Ottawa to provide Detailed Design & Estimates
- Deposits
- Scheduling of Work
- Design Considerations
- Other Considerations
- Questions

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INFORMATION REQUIRED BY HYDRO OTTAWA IN ORDER TO PROVIDE DETAILED DESIGNS AND ESTIMATES

- Site Plans – Showing existing and proposed changes to road geometry
- Landscape plans
- Grading plans
- Main point of contact for project – for both communication and billing purposes
- Costing Model – 100% Requestor Funded, Public Service Works & Highways Act, etc
  - Discuss and agree early on!
- Preferred proposed plant location(s) for review and consideration

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DEPOSITS – *PURCHASE ORDERS*

- Design Deposit
  - Required for engineering review/investigation and to produce detailed design and estimate
- Equipment Deposit
  - Required for procurement of long lead items such as Transformers and switchgear
- Final Estimate Deposit
  - Total cost of project, less deposits received. Payment in full is required and all conditions of Estimate letter must be met prior to Hydro Ottawa scheduling work.

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PROJECT FINANCIALS

- Change Requests
  - Information needs to filter through City PM to approve changes resulting in budget variance.
- Project close
  - When work is completed, Hydro Ottawa communicates if there is any need for additional / ongoing work to complete the project.
    - Complete any outstanding / unforeseen issues
    - Assist with clearance issues
    - Manhole collar adjustments
  - *Final billing is based on project actuals

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WHAT HAPPENS AFTER WE RECEIVE THE ABOVE?

- Internal Review
- System Designer is assigned to project
- Kick off meeting
- Design Deposit is requested (design starts once $ is received)
- Equipment Deposit for long lead items may be requested at this time (time sensitive project)
- Detailed relocation design is completed
- Estimate is completed and sent to City
- Construction is scheduled once PO is received in the amount of the final estimate

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SCHEDULING OF WORK

- Hydro Ottawa completes hundreds of construction projects annually and schedules are based on a consistent set of rules
- Hydro Ottawa allocates resources to projects on a priority basis which includes considerations for a project being “construction ready” and having all conditions met
- Hydro Ottawa will typically schedule the start of relocation work 12 weeks out from the time all conditions for construction in estimate letter have been met:
  - PO is received in the amount of the final estimate
  - All land rights secured
  - Municipal consent approved
  - Etc.

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SCHEDULING OF WORK

Other Scheduling Considerations

- Full street closures or full lane closures providing unencumbered access speed up construction significantly
- Allowable daily working hours
- HOL reserves the right to use internal or contract crews
- Hydro Ottawa control room internally managing the coordination of work on our grid
- Safety is our number one priority
  - Project delays with other city contractors or any other reason will not result in HOL compressing their schedule

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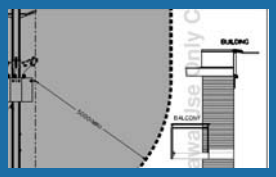
DESIGN CONSIDERATIONS



- Line Clearances
  - Spec OLS0002 – Buildings must maintain 5m clearance, radially, from overhead medium voltage lines and equipment.
  - Hydro Ottawa plant cannot be relocated toward permanent structures within the 5m clearance zone.
    - In existing situations where Hydro plant is closer than 5m, Hydro Ottawa can maintain the existing clearance or make better.
  - *https://hydroottawa.com/outages/safety/safety-outside/overhead-clearance*

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DESIGN CONSIDERATIONS

- Easements, Land Rights, Access Permits
  - Land Rights give Hydro Ottawa legal right to access private or public property to install, maintain (including repairs and replacements) or upgrade its distribution assets.
  - In the case of overhead line relocations, deflections in the line require anchors to support the line, typically these supports need to be located on private property requiring easements
  - The Party Requesting the relocation shall acquire land rights, easements, and access permits for Hydro Ottawa
    - Easements, Land Rights, Access Permits must be in place prior to Hydro Ottawa relocating plant

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DESIGN CONSIDERATIONS

- Overhead to Underground Conversion
  - Requestor Pays 100%
  - Official request to Hydro Ottawa must be made in writing
  - Hydro Ottawa will provide an initial Level B Estimate (+75%/-25%)
  - Hydro Ottawa will determine scope of undergrounding plant by looking at ongoing reliability, maintenance, and operating impacts to circuitry.
  - These projects require considerable lead time for design and construction purposes depending on scope and area density.

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DESIGN CONSIDERATIONS

- Customer Service Upgrades
  - Plant relocations requiring the re-servicing of customers can trigger bringing their on site and internal services up to current standard
  - Appendix G-0 – Note 13 – *Conditions of Service*
    - *If and when any Customer Service equipment work is undertaken that requires an Electrical Safety Authority permit and an isolation by Hydro Ottawa, the following non-standard Service equipment configurations must be brought to Hydro Ottawa's current technical servicing standards:*
  - https://hydroottawa.com/accounts-and-billing/contractors-and-developers/conditions-of-service

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DESIGN CONSIDERATIONS

- Utility submitted Municipal Consent
  - Envista
    - Up to 12 Weeks
- City circulated Composite Utility Plan
  - All utility designs on one plan
  - Typically quicker turn around time when compared to utility only circulation

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DESIGN CONSIDERATIONS

- Other utilities
  - Do other utilities need to be relocated prior to Hydro Ottawa plant? Do they need to be moved to accommodate Hydro's final locations?
  - Third party tenants on poles
    - Hydro Ottawa cannot remove pole butts until all third party attacher's have been relocated
    - Stand alone street lighting vs hydro pole mounted
    - Timing of other utility relocations

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DESIGN CONSIDERATIONS

- Line Locations
  - The total number of poles (Hydro, Bell, street lighting) should be minimized. This requires joint planning and construction along the road allowance
  - Poles should not be installed in small medians (< 6 m wide) or turning islands in the roadway where possible
  - In existing urban areas, poles located along curb lines shall be set so that there is a minimum of 500 mm, where possible, between the nearest surface of the pole and the roadside curb / sidewalk
  - Hydro Plant should be installed in locations to allow ease of ongoing access for maintenance and operations
  - Planned and/or final grade changes

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DESIGN CONSIDERATIONS

- Anchoring and Deflections in overhead lines
  - Poles are anchored and guyed to increase the strength of an overhead line to counteract any physical loading imbalance resulting from any of the following:
    - · Line angles
    - · Dead-ends
    - · Lateral Take-offs
    - · Hillside construction
    - · Line tension changes
    - · Heavy distribution equipment
    - · Road and Rail Crossings

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DESIGN CONSIDERATIONS

- Anchoring and Deflections in overhead lines *(continued)*
  - Relocating one pole out of line will result in three anchoring points
  - The taller the pole, the more conductors, the longer the anchor lead lengths need to be
  - Anchoring to trees and buildings is not permissible
  - Where anchoring is required toward a road way, “stub poles” may be required on the opposite side of the street to support the line
  - Self Supporting poles – specially engineered, require large underground bases, costly, long lead items

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DESIGN CONSIDERATIONS

- Manhole inspections to determine condition
  - Replace / rebuild deteriorated manholes prior to project start
- Confirmation of grade changes expected.
  - Inspect & record MH collar heights to determine availability of adjustments for any road grade changes
    - Rebuild MH / MH roof to allow for any grade changes
- Inspect or rod/rope duct structures
- Relocation of manholes off / away from future road surfaces
  - Accessible locations

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DESIGN CONSIDERATIONS

- Civil duct structure may need to be extended beyond future road way.
- Additional equipment requires space or easements
  - Switchgear, pad-mount transformers, Vault equipment
- Relocation of underground duct and manhole systems can involve a large amount of cable replacement depending on the number of circuits affected.
- Road Cut Moratorium
  - Any civil work in / along the roadway attempted to be completed prior to project start
  - For OH/UG conversions, final reinstatement may be 6mo + beyond civil complete date. (pole removal, service transfers etc)

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HYDRO OTTAWA CIVIL WORK ONLY ALTERNATE BID

- Discussed on case by case basis, prior to start of construction.
- Civil works required to complete the Hydro Ottawa electrical work can be completed by the General contractor in locations where there are no electrical hazards
  - Minimum 1.5m away from plant with existing electrical cables or equipment
  - Must be completed by a Hydro Ottawa qualified contractor
  - Hydro Ottawa inspection required throughout construction
- 1.5m tie ins, Manhole collar adjustments, or other work on electrical plant must be completed by Hydro Ottawa
- Reduced coordination when hiring one of Hydro Ottawa's regular Approved civil contractors
  - Minimizes delays due to time and space, or locate / permits

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CONSTRUCTION CONSIDERATIONS

Safe limits of approach:

- 10ft (3m) minimum clearance between High voltage conductors and persons or equipment
- Contact Hydro Ottawa if you require work within 3m. (Tree trimming, relocation of conductors)
- Hydro Ottawa does not provide cover-up / flags on primary conductor

Limits of Approach
Maintain Maximum Clearances and Install Barriers Where Practical

	Personnel Zones			Mobile Work Equipment		
Voltages	**OHSA Minimum**	**Authorized Worker**	**Restricted Zone**	**OHSA**	**Non-Insulated Boom**	**Certified Insulated Aerial Device**
750 V to 15 kV	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	0.9 m to 0.3 m (3 ft. to 1 ft.)	> 3.0 m (10 ft.)	> 0.9 m (3 ft.)	> 0.3 m (1 ft.)
> 15 kV to 35 kV			0.9 m to 0.45 m (3 ft. to 1.5 ft.)			> 0.45 m (1.5 ft.)
> 35 kV to 50 kV		> 1.2 m (4 ft.)	1.2 m to 0.6 m (4 ft. to 2 ft.)		> 1.2 m (4 ft.)	
> 50 kV to 150 kV		> 1.5 m (5 ft.)	1.5 m to 0.9 m (5 ft. to 3 ft.)		> 2.4 m (8 ft.)	> 0.9 m (3 ft.)
> 150 kV to 250 kV	> 4.5 m (15 ft.)	> 2.1 m (7 ft.)	2.1 m to 1.2 m (7 ft. to 4 ft.)	> 4.5 m (15 ft.)	> 3.0 m (10 ft.)	> 1.2 m (4 ft.)
> 250 kV to 550 kV	> 6.0 m (20 ft.)	> 3.7 m (12 ft.)	3.7 m to 2.75 m (12 ft. to 9 ft.)	> 6.0 m (20 ft.)	> 4.6 m (15 ft.)	> 2.75 m (9 ft.)
SYMBOLS ≤ less than or equal to > greater than < less than				cranes, power shovels back-hoes, mech. brush cutter	RDB, aerial ladder, work platform, uncertified aerial device	certified and tested by ***certified laboratory***

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OTHER CONSIDERATIONS

- Constructor
  - Has the greatest degree of control over Health and Safety at the entire Project site.
  - Responsible for the health and safety of all workers on the Project site.
  - Keep in mind
    - Does Hydro Ottawa need to relocate prior to City contractor taking control of site?
    - Does time need to be allocated for City contractor to leave site to allow Hydro Ottawa to jump in and complete work?

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ELECTRICAL CONNECTIONS

- Site trailer temp service provided through Service Layouts
- New / Modified traffic or street light service points need to go through service layouts as timing does not always match Hydro Ottawa's dedicated construction crew schedule.
- All new or modified services require ESA approval prior to connection
- Street lights on poles which are being replace can be transferred by Hydro Ottawa providing relocation is < 3m
  - Greater distances need to go through city street lighting as calculations need to be completed.

https://hydroottawa.com/accounts-and-billing/business/request

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COMMUNICATIONS

- Communications to area residents & businesses
  - City Notification or Hydro Ottawa notification depending on timing of construction

    Community open house requirement?

    If Hydro Ottawa work to take place well ahead of road works, typically Hydro Ottawa will notify area residents and businesses of upcoming planned work.
  - Planned outages – Hydro Ottawa takes care of planned electrical outage communications during construction as required

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CONCLUSION

- Get in the door early to discuss projects
  - Time required from initial contact to construction complete could be a year or more depending on complexity of the project.
- The earlier the better!
  - Hydro Ottawa has a large capital sustainment program and other customer demand projects where the deposits have been paid
- Time and space separation
  - Earlier relocations for Hydro Ottawa can mean less issues in creating time and space separation with the city project constructor.
  - Less potential delays for the heavy civil works.

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CONCLUSION (CONT)

- Communication, Communication, Communication
  - Keep the Hydro Ottawa Designer in the loop on timelines, issues, changes to the project
  - Single point of contact
  - On large projects, regular progress update meetings have been valuable to project success!
    - Design and Construction phase
  - Hydro Ottawa is only able to move our own plant. Coordination is needed for street lights / signals / telecom, brought in at the same time as Hydro Ottawa, as a lot of their plans can hinge on Hydro's design.

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HYDRO OTTAWA CONTACTS

- Emmanuel Coffee – Underground supervisor
  - 613-738-5499,7225 EmmanuelCoffie@hydroottawa.com
- Tom Corriveau – Acting Overhead Supervisor
  - 613-738-5499, 7262 ThomasCorriveau@hydroottawa.com
- Damage prevention civil inspectors
  - *Process is changing to an online form

DANGER DO NOT PROCEED
Buried high voltage cables within 1.5M of the located area. You MUST send locate to **HOLsupervisions@hydroottawa.com** or contact Hydro Ottawa at **613-738-6418** for further information.
AFTER HOURS "EMERGENCY" NUMBER IS **613-738-6422**

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>QUESTIONS