

Urban Pigging Challenges (MGN)

Design Feasibility, Constraints & Lessons Learned
from recent ILI projects

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Introduction

Scope:

Focus on the challenges of executing ILI within an urban brownfield T1 environment.

Considering learnings from past 3 ILI inspections and assessing how they better support upcoming ILI projects.

Purpose:

To share and ensure industry better understands the below in an urban environment:

- The real constraints,
- The risk profile, and
- The decision points required before progressing further.

Why Urban Pigging in Networks is Different

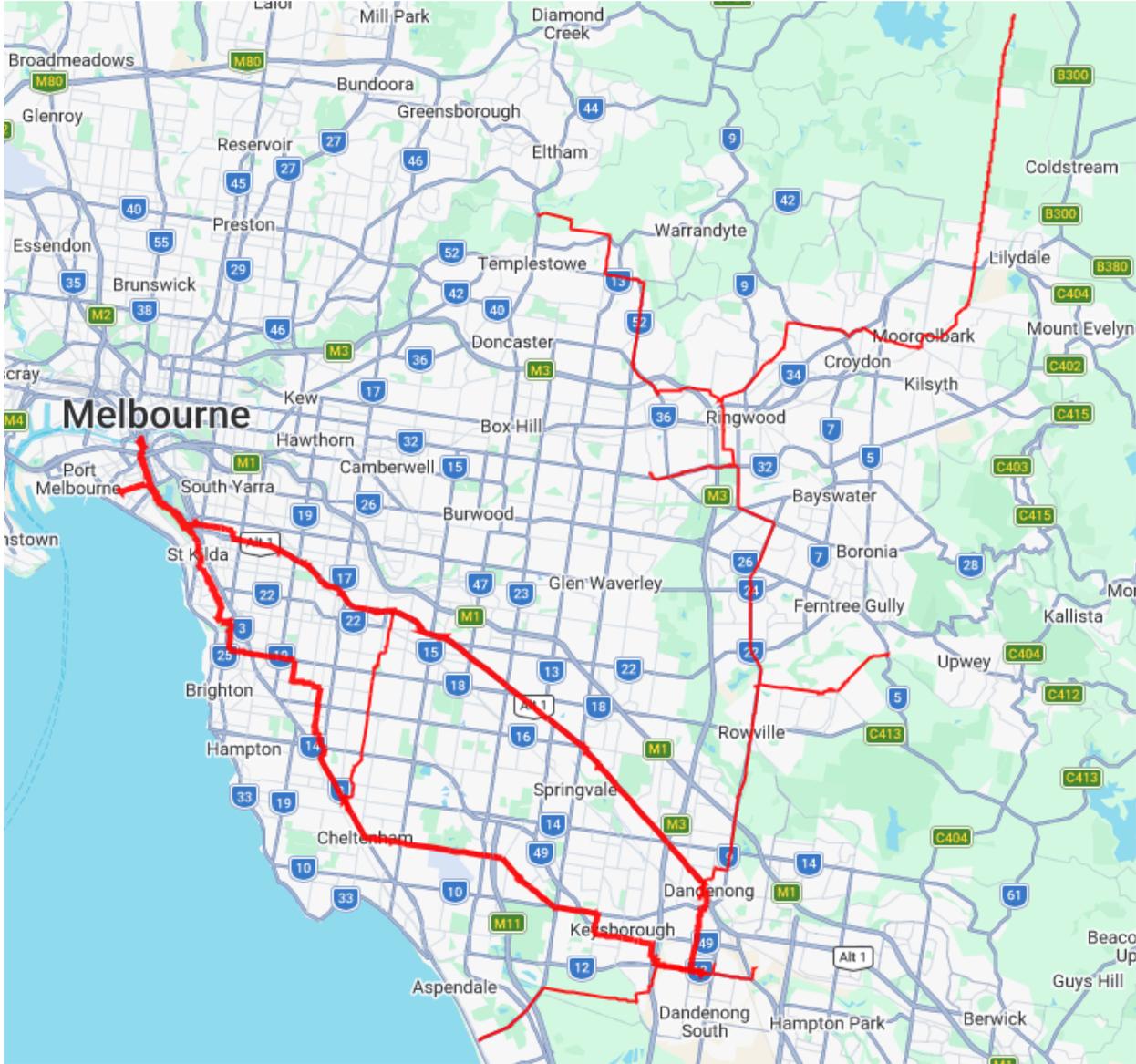
Urban pigging is no longer just mechanical modification to network; it includes:

- Network control + Finding the “Golden Window” of optimal flow
- Constructability + elevated stakeholder management required.
- Public exposure and traffic constraints elevate risk.
- Safety and organization risk management is highly involved

Pigging in urban brownfield T1 environments increase complexity and requires system-wide coordination.

- PL 40 and PL 142: Established ILI methodology in high density urban environment.
- PL276: Refined execution under constraints.
- Upcoming PL56 in increased high-density urban and public sensitivity challenges.

AGIG (MGN) Metropolitan Transmission and HP 2 network



Reference Projects Overview

PL 40 – DN 450 Inner Ring Main (37km – MGN section) - Execution baseline

- 4 successful ILI runs over 30 years

PL 142 – DN150 Rowville to Ferntree Gully (5.8 km)

- Successful MFL + Geo + XYZ run.
- Velocity discipline maintained within 1–5 m/s.
- Strong ILI data confidence

PL 276 – DN300 Lilydale (10.4 km) – Execution Under Constraints

- Pig Trap mobility across sites.
- Flow optimisation window and supply control critical for network, including liaison with AEMO.
- Third-party assets and constraints increase risk (e.g. Powerline limitations at Maroondah Hwy).

PL56 (T07) – Urban Context and Key Constraints

DN300 | 8.3 km | Commissioned 1965 | CL 300 – 2760 kPa MAOP

- Coal tar enamel coated legacy asset.
- 28 recorded sharp bends along alignment.
- Hobart Rd hot tap and aboveground temporary launcher assembly on road in urban T1 Residential and Sensitive (S) location class.
- CIC corridor and impacted third party asset liaison, Fragile 3rd party assets in vicinity
- Sir William Fry Reserve temporary receiver assembly.
- Winter flow window and network optimisation required for pigging conditions.

Hobart Road – Feasibility Constraints and Major Risk Areas

Hobart Road Trap Assembly footprint within roadway corridor, constraints and limitations:

- Road Occupancy and Traffic management escalation risk.
- Residential and school proximity (T1 / S location classification)
- Hot tap stopple + bypass on live main - execution complexity in legacy asset.
- Legacy third-party buried assets – Cast Iron water main utility strike risk.
- Limited emergency access and laydown.
- Public interface & reputation exposure.

Hobart Rd, Murrumbeena – Pig Launcher End



SWF Reserve, Highett – Pig Receiver End



Design and Hot Tap Considerations and Challenges

Design Feasibility Assessment Framework

Trap Location Criteria:

- Footprint and skid support envelope.
- Emergency isolation accessibility.
- Public separation and barricading radius.
- Noise & emissions management (ZEVAC consideration).
- Constructability and crane access.
- Flow direction and launcher/receiver optimisation.

Legacy Asset & Third-Party Risk Considerations

- Legacy Pipe, 1965 construction – material & weld variability.
- Coal tar enamel disbondment risk.
- Hot tap tie-ins.
- 3rd Party utility crossings & asset strikes.

Mitigation:

- Pre-planned and enhanced NDT, field verification & conservative hot tap design.
- QL-A provings for 3rd party assets

Operational and Stakeholder Considerations and Challenges

Network Flow & System Control

- Target velocity: 1–5 m/s.
- Required winter flow biasing
- Branch connections increase stall risk.

Mitigation:

- Hydraulic modelling prior to mobilization.
- Temporary branch flow suppression.
- AEMO coordination for window locking.

Stakeholder Consultations

- Residents – Communication & risk transparency.
- AEMO – Network flow & system biasing.
- ESV – Regulatory oversight.
- VicRoads – Road occupancy permits.
- Local Council & DEECA – Environmental controls.
- ILI & Hot Tap Vendors – Tool compatibility & safety

Environmental Limitation and Risk Considerations

Urban Sensitivity & Public Interface

- School-hour restrictions
- Noise and gas venting controls
- Community notification strategy
- Emergency response coordination
- Traffic staging to minimize disruption
- Safely handling contaminants / debris

High Impact Risks:

- Stalled pig at branch connections or tight bends.
- Traffic management costs.
- Hot tap execution complication.
- Public complaint or incident.

Control: Early modelling, constructability workshops, permit pre-engagement.

Summary of Key Lessons and Considerations

Lessons Applied from Previous Campaigns

From PL142:

- Tool velocity discipline.
- Debris and ERF assessment workflow.

From PL276:

- Trap mobility increases risk exposure.
- Network optimisation critical to success.
- Early constructability review reduces cost variation.

Key Considerations for PL56 (T07):

- Conduct early constructability & risk workshop.
- Confirm alternate Hobart Rd trap positioning.
- Lock winter flow window with AEMO.
- Execute enhanced utility survey & GPR scan.
- Pre-negotiate VicRoads occupancy.
- Develop structured community communication pack

Photos from previous projects



PL40 – DN 450 Inner Ring Main – Launch trap at Cnr of Princes Hwy and Henty St in 1991



PL 40 – Same Location in 2021 – Night works

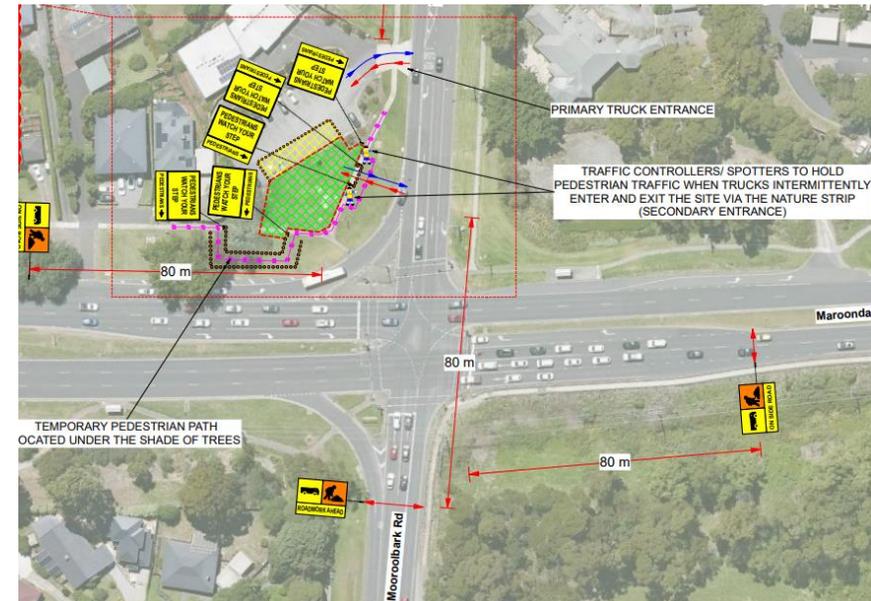
Photos from previous projects



PL142 – DN 150 @ 2760 kPa MAOP. Pig launcher trap at Cnr of Stud and Kelletts Rd



PL 276 – DN 300 @ 2760 kPa MAOP. Pig Receiver trap at Cnr of Maroondah Hwy and Victoria Rd



Conclusion and Way Forward

PL56 will be a proper test in a high-density urban environment, success depends on:

1. Engineering rigor
2. Network system control discipline
3. Proactive stakeholder management.
4. Early risk assessments and mitigation approach

By applying these lessons, execution of PL56 and future projects can better manage scope, costs, and risks, ensuring more efficient execution and financial control.

Questions