DISTRICT OF HUDSON'S HOPE

Lift Station Assessment – Kendrick (Dudley Drive) and Adam Street Lift Stations | JAN 2022

URBAN SYSTEMS
10808, 100TH STREET
FORT ST. JOHN, BC V1J 3Z6

PREPARED FOR:

District of Hudson's Hope
9904 Dudley Drive
Hudson's Hope, BC, V0C 1V0

ATTENTION:

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PREPARED BY:

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DATE: JANUARY 26, 2022

FILE: 0664.0052.01

TABLE OF CONTENTS

1.0 INTRODUCTION

Urban Systems Ltd. (Urban) has been retained by the District of Hudson's Hope (District) to complete this assessment on the condition of the Kendrick and Adam Street Lift Stations, located in Hudson's Hope, to aid the District in planning for future upgrades and/or replacements. Urban has secured two subconsultants to help with this assessment. Scouten Engineering (Scouten) has provided a structural condition assessment which is located in Appendix C. Exceed Electrical Engineering (Exceed) assessed the electrical components and provided a condition memo which is located in Appendix D.

On September 16, 2021, Urban met with the District to scope out the lift station assessment work program, and discuss the issues the District had been experiencing with both lift stations. The main concerns that we heard from District staff were that Adam Street lift station has had more alarm calls than should be expected, and the Kendrick lift station had encountered two leaks in a short span of time. During this meeting, the District brought to Urban's attention that they would also like to investigate options to reduce the need for two hydrovac trucks on each time they perform pump or other lift station maintenance. The District also requested Urban to review options for structures to house the electrical components, and any proposed valves for each lift station.

On November 9, 2021, representatives from Urban and Scouten met with the District to discuss their concerns from safety, operational, and maintenance perspectives, after which inspections of the wet wells and control kiosks were completed with assistance from the District's Public Works staff. Wastewater from the wet well was not fully pumped out and the pumps were not removed at time of inspection so the condition of the base of the wet wells and the pumps were not assessed. The following memo will summarize the findings from this visit and make recommendations based on those findings.

2.0 KENDRICK LIFT STATION

2.1 BACKGROUND

Kendrick Lift Station, also known as Dudley Drive Lift Station, is located along Dudley Drive near Holland Street and services approximately 30-40 residences and the public swimming pool. This lift station was built in 1967 and has a wet well consisting of a precast concrete base and circular precast concrete rings. The wet well is approximately 1.8 m (72") in diameter and 5.2 m (17') in depth from base to the top of hatch.

Access into the wet well is secured with a two-piece rectangular steel cover locked in place with a steel bar and padlock, installed at ground level. Interior access is via ladder irons, spaced 400 mm (16") on center, secured to the well interior.

There are 3 inlet pipes into the wet well, 2, 150 mm asbestos-cement (AC) pipes that are shown on the drawings provided by the District and a single 200 mm PVC pipe installed more recently. The 2 AC pipes appear to be abandoned based on the District's CAD base. The

PVC pipe was the only pipe flowing during the inspection. The outlet pipe is a 100 mm AC force-main that is approximately 130m in length, and discharges into a manhole on the east end of Garbitt Crescent near Dudley Drive[1]. Based on discussions with the District, they are not currently experiencing any capacity issues with this lift station. Since no current issues exist, and we are not aware of any plans for urban densification of the upstream service area, a detailed capacity review was not completed as part of this assessment.

In 2018 the Kendrick Lift Station received an electrical upgrade which resulted in a reduction in alarm calls.

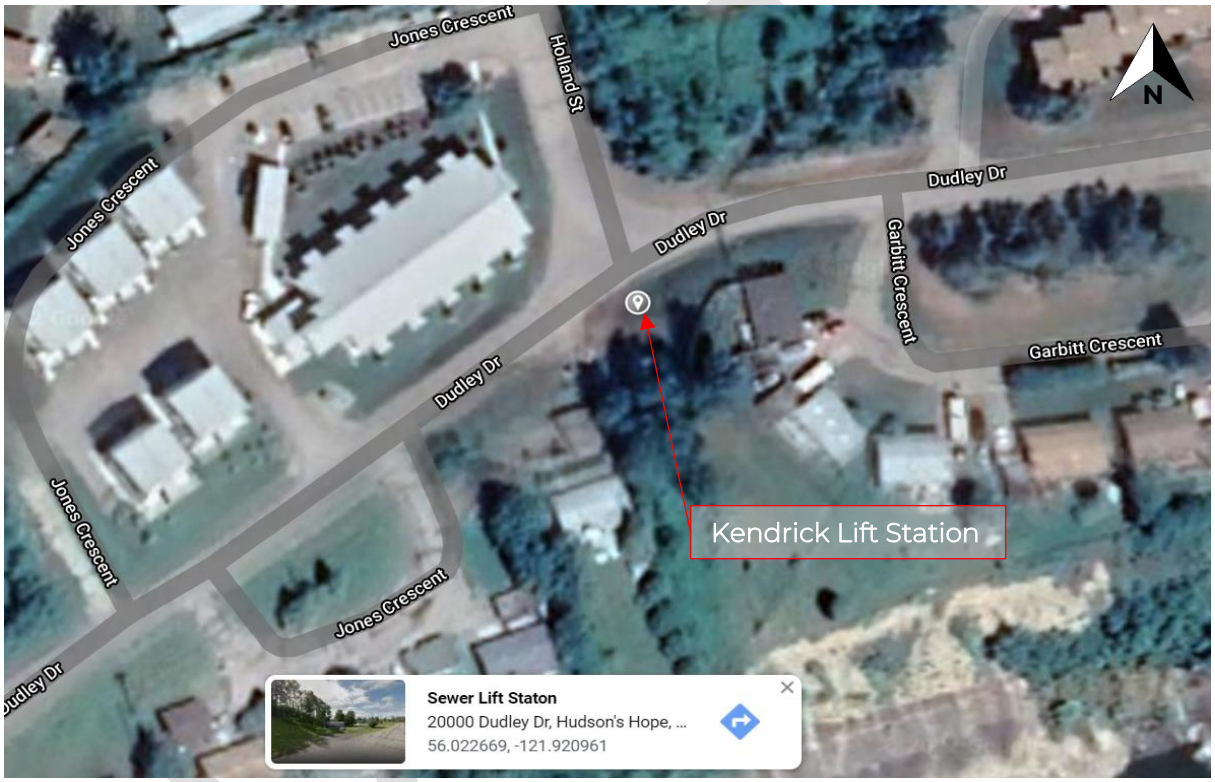

Figure 1: Location plan for Kendrick Lift Station

2.2 EXISTING CONDITIONS OF NOTE

From our site visit and discussion with District staff, we have noted the following areas of concern at the Kendrick Lift Station:

- The wet well piping appears to be beyond its service life. There was previously a leak on the force-main just before the inside wall of the wet well. This was repaired with a steel repair coupler. From discussions with the District's Public Works staff, they suspect that this leak was likely caused by pitting leading to a crack. If there is pitting corrosion to the degree that it is causing pipe failure, it is possible that other piping

[1] Force-main alignment, sizing, and length is based on record drawings provided by the District and the District of Hudson's Hope CAD base.

in the wet well and tying into the AC pipe outside the wet well could also be in poor or very poor condition.
    - When Urban was on site, heavy surface corrosion was observed on the steel piping downstream of the pumps. The full extent of the corrosion is uncertain, but given the past failure, and corrosion observed, it seems likely that the piping is susceptible to additional failures.
- Based on the pump record observed, the run times between the two pumps is irregular. Pump #2 runs approximately 2-3 times longer than Pump #1 on average each day. Under optimal operating conditions and similar pump efficiencies, they should be running for approximately the same amount of time daily.
    - The pump records observed were for approximately one week of operation. A review of a longer pump record could help determine if this a temporary phenomenon, or if this has been an ongoing trend. The total hour meters for the pumps would lead us to believe that Pump #2 does run much more than Pump #1.
- There does not appear to be any isolation valving in the wet well. The check valve assemblies also appear to be significantly corroded. Not having operational isolation options and backflow prevention within the piping poses a significant risk, especially during a shut down or break event.
- The first ladder iron is approximately 1 m below the lid which makes it difficult and unsafe to reach when entering the wet well. Based on our understanding this would be in contravention to WorkSafeBC requirements for access to confined spaces.
- The steel cover plates do not have handles to aid in removal and are not connected to the frames. Due to the size and weight of these cover plates, it is difficult and unsafe for staff to remove them, a concern that was brought forward by District staff. Reinstalling them creates hazardous pinch. Given the shape of the of the plates, there is also a risk for them to fall into the wet well and to damage piping or equipment below.
- There are no fall protection measures in place for people working around an open wet well. Based on WorkSafeBC OHS Regulation 11.2, "…an employer must ensure that a fall protection system is used when work is being done at a place from which a fall of 3 m (10 ft) or more may occur."
- Urban was informed by the District's Public Works staff that the force-main passes under a structure on private property which creates a risk for District should this force- main fail or require maintenance within the extents of private property.
    - The AC force-main is assumed to be the same main that was installed in the 1970's. If this is the case, this main is near the end of its theoretical service life. It could be serviceable for years to come, but as time passes, the likelihood of failure, and potential issues below this structure, will increase.
- The District relies on portable power generators during power outages. No concerns were noted by the District's Public Works staff regarding the use of portable power generators.

- Since the pumps were not removed during the site visit, their condition was not assessed.
- Since the wastewater was not pumped out during the site visit, the rail condition could not be fully assessed. There was a build-up of material on the rails near the water line and some corrosion noted, however the rails above the water line appeared to be in fair condition.
- The wet well and electrical kiosk are not currently housed in a structure, but the District has presented interest in housing these in the future.

2.3 SUMMARY OF STRUCTURAL CONDITION ASSESSMENT

On November 9, 2021, Scouten completed a visual and hammer-sounding inspection of the wet well to evaluate the structural condition. Wastewater from the wet well was not fully pumped out at time of inspection so the condition of the base of the wet well was not assessed.

The full structural condition report is appended, and a summary is provided below:

- No delaminated or carbonated concrete.
- Minor spalling noted in localized areas, but the surrounding concrete was stable.
- The ladder irons were corroded.
- Cracks were sealed with bitumen mastic (top concrete ring only).
- No infiltration of ground water into the wet wall was noted.
- No significant displacement of concrete rings noted.
- Grease build-up noted around bottom precast unit, ladder irons, and around the pumps.
- Rust staining at various locations on wet well walls, but no structurally significant damage.

The overall condition was observed to be good at the time of inspection, however Scouten lists some recommendations which are summarized below:

- Fully pump out the wet well and clean the buildup of grease on the lower walls. Complete a structural inspection of the base at this time as well.
- Clean the corrosion off the ladder irons and apply a protective coating to prevent further corrosion.
- Complete regular inspection and preventative maintenance.
- Inspect and clean the pumps and other equipment quarterly.

Based on the condition of the components inspected, the remaining life of the concrete wet well at Kendrick Lift Station is estimated to be approximately 20 years.

2.4 ELECTRICAL CONDITION

During the site visit, Urban photographed the inside of the control kiosk and provided the photographs to Exceed to review and provide a condition memo. The full condition memo is appended, and a summary is provided below:

- The components within the kiosk are beyond the typical lifetime of approximately 20 years.
- The recent upgrades noted in the photos were the replacement of a 24V power supply, replacement of pump starters, and addition of a cellular alarm dialer.
- Support and replacement parts for the Automation Direct Koyo DirectLOGIC 06 Programmable Logic Controller (PLC) are difficult to obtain and may soon be unattainable.
- There is a receptacle to connect a portable generator; however, there does not appear to be a manual transfer switch for portable power inside the kiosk.

In general, they are suggesting that the electrical components of the station require complete replacement in order to have a modern and fully functional station.

2.5 RECOMMENDED ACTIONS

Although the areas of the concrete wet well that were visible during the inspection have approximately 20 years of remaining life, other components are nearing the end of their service life, or have exceeded it. Due to the aging steel piping infrastructure, concerns with the force main passing under private property, safety concerns, and outdated electrical/control system a full lift station replacement may be warranted to provide a fully functional and modern lift station. Completing the assessment of the wet well base and pumps recommended below may be beneficial in deciding on a replacement timeline. Assessing a lift station replacement was not part of Urban's scope so the recommendations below are for replacing equipment to match existing, improving safety, and providing costs for upgrades requested by the District (i.e. housing structure and an alternative to reduce the number of vacuum trucks required for maintenance.) If the District plans on replacing this lift station in the near future, the recommendations below should be considered with respect to their necessity in the short-term, with the exception of the safety improvements which are required to meet WorkSafeBC regulations.

Below is a list of recommendation based on our understanding of the District's existing concerns and considering the discussion above.

SAFETY RECOMMENDATIONS

- Install additional ladder irons to meet WorkSafeBC regulations.
- Install handles on cover plates and consider a new secured hatch cover.
- Install or provide fall protection measures to ensure compliance with WorkSafeBC Regulations. If fall protection anchors are going to be installed, they will need to be certified by a Professional Engineer.

ASSESSMENT/ENGINEERING RECOMMENDATIONS

- Pump the wet well out and have an inspector assess the condition of the rails, pumps, pump connections, and pump retrieval system. This should be done in conjunction with the inspection of the bottom of the wet well recommended below.
    - When the pumps are pulled for assessment, they should be pressurized and tested for leaks.
    - Each of the pumps should be mechanically inspected and flow-tested to determine if there is a difference in flow rate between the two and their rated capacity.
- Regarding the irregular pump times, a larger segment of the recent pump records (3-6 months) should be gathered so it can be assessed whether the irregular pump times are a relatively isolated occurrence of this has been happening over an extended period.[2]

OTHER RECOMMENDATIONS

- Investigate options for replacing and rerouting the force-main that is currently under private property to within the District's property so it is accessible for maintenance.
- Clean the corrosion off the ladder irons and apply a protective coating to prevent further corrosion.
- Fully pump out the wet well and clean the buildup of grease on the lower walls. Complete a structural inspection of the base at this time as well.
- Complete regular inspection and preventative maintenance.
- Inspect and clean the pumps and other equipment quarterly.
- The wet well piping appears to be beyond its service life. Due to the recent leaks and the heavy corrosion of the piping and check valves within the wet well, these and all other mechanical components should be replaced.[2]
- The District noted that the cost of vacuum trucks during maintenance operations is a concern to them. Although not required for the operation of the lift station, but to address the District's concerns double block-and-bleed valves on the force-main and the active inlet pipe could be installed to allow for complete isolation within the wet well. This may reduce the number of vacuum trucks required for pump maintenance or other operations requiring bypass pumping and would make maintenance of the lift station consistent with Beattie, and current WorkSafeBC regulations. Ideally this work would be completed when the steel force-main piping is being replaced[2]
- Replace electrical/control system with modern controls infrastructure, alarming, back-up generator readiness, modern instrumentation, and back-up system in the event of a PLC failure.[2]

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[2] These recommendations may not be required prior to the replacement of the lift station depending on the timing for replacement and should be assessed further once replacement timing is determined.

3.0 ADAM STREET LIFT STATION

3.1 BACKGROUND

Adam Street Lift Station is located approximately 600 m south of the intersection between Adam Street and Dudley Drive and services approximately 25-30 residences. Based on the drawings provided by the District and the fabrication date on the wet well, we assume the wet well was constructed in 1996. This lift station consists of a single-unit fiberglass reinforced plastic (FRP) wet well with a maintenance access hatch in the FRP cover. The wet well is 1.8 m in diameter and 6.3 m in depth. Interior access is provided via an aluminum ladder with 300 mm (12") on center rung spacing, permanently affixed to the inside leading to a galvanized steel framed service platform with fiberglass grating approximately 4.6 m (15 ft) from the top of the well.

Figure 2: Location plan for Adam Street Lift Station

There are two inlets to the Adam Street lift station: one 200 mm PVC gravity main to the northeast, and another to the southwest of the lift station. On the downstream side of the lift station, the 100 mm PVC force-main is approximately 780 m long, running northeast up Adam Street, and discharging into a manhole north of the Adam Street and Dudley Drive intersection[3]. Based on discussions with the District, they are not currently experiencing any issues with this lift station being under capacity. However, based on operational discussions with District staff, they have indicated that the lift station may be over capacity. Additional

[3] Inlet and outlet piping is based on record drawings from the Adam Street lift station (1996).

details are provided below. Given the scope of this assessment, the issues outlined by District staff were noted, but a detailed capacity review was not completed as part of this assessment.

3.2 EXISTING CONDITIONS OF NOTE

From our site visit and discussion with District staff, we have noted the following areas of concern at Adam Street Lift Station:

- District staff have observed several alarm calls at this lift station with alarm types including electrical malfunctions, intermittent power supply interruptions, and issues with pump engagement, many of which were resolved by the time the District staff arrived on site.
- Due to the low flows into this lift station, the District's Public Works staff occasionally add water to engage the pumps. This indicates either that the capacity of this lift station is oversized for the current inlet flows, or that the levels are spaced too far apart between the pump on and pump off controls.
- The District relies on portable power generators during power outages. No concerns were noted by the District's Public Works staff regarding the use of portable power generators.
- The buildup of material on the walls resulted in an issue with the float pump control system in August 2020, requiring a service call by Epscan, as noted in their invoice.
- The wet well and electrical kiosk are not currently housed in a structure, but the District has presented interest in housing these in the future.

3.3 SUMMARY OF STRUCTURAL CONDITION ASSESSMENT

On November 9, 2021, Scouten completed a visual inspection of the wet well to evaluate the structural condition. Wastewater from the wet well was not fully pumped out at time of inspection so the condition of the base of the wet well was not assessed.

The full structural condition report is appended, and a summary is provided below:

- Minor corrosion was noted on the connections between the ladder and the wet well walls.
- The platform was observed to be in good condition.

Similarly, to Kendrick Lift Station, the overall condition of Adam Street Lift Station was observed to be good at the time of inspection, however Scouten lists some recommendations which are summarized below:

- Clean the wet well annually to prevent a build-up of grease and other solids.
- Complete regular inspection and preventative maintenance.
- Inspect and clean the pumps and other equipment quarterly.

Based on the condition of the components inspected, the estimated remaining life of the FRP wet well at Adam Street Lift Station is 75 years.

3.4 ELECTRICAL CONDITION

During the site visit, Urban photographed the inside of the control kiosk and provided the photographs to Exceed to review and provide a condition memo. The full condition memo is appended, and a summary is provided below:

- The components within the kiosk are beyond the typical lifetime of approximately 20 years.
- The only upgrade noted in the photos were the addition of a cellular alarm dialer.
- There is a receptacle to connect a portable generator; however, there does not appear to be a manual transfer switch for portable power inside the kiosk.

3.5 RECOMMENDED ACTIONS

In addition to the structural recommendations in Section 3.3, and based on our understanding of the District's existing concerns, Urban recommends the following:

- The District noted that the cost of vacuum trucks during maintenance operations is a concern to them. Urban recommends completing a feasibility study to assess the options below while considering frequency of maintenance operations, current and future client needs, and via a cost-benefit analysis.
    - Plugging manholes;
    - Specialized entrance procedure;
    - Continuing to use vacuum trucks;
    - Re-configuring the layout to reduce the number of inlet pipes into the wet well;
    - Installation of double block-and-bleed valves; or
    - A combination of these or other viable options.
- Check the levels on the pump control floats. If there is room to adjust the pump on/off float to be closer together without being too close together (thereby creating control issues), this could be tested by District staff to see if it improves pump cycling frequency.
- Replace electrical/control system with modern controls infrastructure, alarming, back-up generator readiness, modern instrumentation, and back-up system in the event of a PLC failure

4.0 COST ESTIMATES

Below are Class D cost estimates for the recommended upgrade work, in $CAD, excluding GST. Routine maintenance and inspection costs were not included. Although housing the lift stations within structures are not necessary at either lift station, Urban has provided costs for structures at the District's request. Note that depending on the timeline for replacing Kendrick lift station, it may not be cost effective to house it before the replacement.

ITEM	ESTIMATED COST
Part A – Kendrick Lift Station	
Install additional ladder irons; assumed Public Works or local contractor would complete this	$1,000
Clean corrosion off ladder irons and apply protective coating; assumed Public Works or local contractor would complete this	$1,000
Install handles on cover plates; assumed welded by machine shop	$1,000
Allowance for fall protection measures	$15,000
Pump out and clean the wet well for inspection	$10,000
Replace check valve assemblies and force-main piping from pump outlets to AC transition (including bypass pumping or vac truck requirements)	$60,000
Install two double block-and-bleed valves and bleed chambers; assumed work to be completed at same time as replacing check valves and force-main piping	$50,000
House the lift station in a structure; assumed the electrical kiosk will be enclosed in a separate structure as captured below	$200,000
Replace electrical kiosk with a new, enclosed structure	$110,000
PART A - Subtotal – Kendrick LS	$448,000[4]
Part B – Adam Street Lift Station	
House the lift station in a structure	$200,000
Replace electrical kiosk with a new, enclosed structure	$120,000
PART B – Subtotal – Adam Street LS	$320,000
Subtotal – PARTS A & B	$768,000
Contingency (35%)	$269,000
Engineering (15%)	$155,000
PART C – Engineering-Only Work	
Kendrick LS - Inspect the wet well base and assess the condition of the rails, pumps, pump connections, and pump retrieval system (Inspection may result in recommendations for additional capital costs which are not captured here)	$5,000
Adam Street LS - Feasibility study	$15,000
PART C – Subtotal – Engineering-Only Work	$20,000
Total Cost	$1,212,000

[4] The District should assess each of Kendrick's recommendations against the timing of replacing the lift station with the exception of safety-related recommendations

Note the above costs do not include investigation work for other items outside of the scope of the lift station assessment, or the costs associated with potential construction to remedy those issues to be investigated. The items excluded from the cost estimate above are:

- Investigation of force-main alignment downstream of the Kendrick Lift Station, and costs associated with replacement.
- Review and assess pump run times at Kendrick for long-term irregularities.

5.0 SUMMARY + NEXT STEPS

The Kendrick lift station has a relatively short remaining lifespan in the structure, estimated at 20 years for the visibly inspected areas of the wet well, and less lifespan in some of the piping and other components. There is some additional investigation that should take place to confirm the full suite of upgrades for Kendrick before a final determination is made whether replacement or rehabilitation of selective components is a better option. To determine whether replacement or renewal is the best next step, the District should consider the following:

1) Are there minor upgrades (such as safety improvements) that should be done within the upcoming year before additional investigation takes place?
2) What is the District's risk tolerance for the force-main that is constructed on private property in case of failure?
3) What is the risk tolerance to internal piping or pump failure in the wet well and can those risks be mitigated effectively with available resources?
4) Is a structure over the wet well necessary before lift station replacement?
5) Is a structure over the wet well necessary given there are no above grade components susceptible to weather?
6) Are the electrical kiosk upgrades necessary before lift station replacement?

The Adam Street Lift Station is in good condition, and the structure of the wet well is estimated to have 75 years of remaining lifespan. Some of the components of the electrical kiosk are beyond their expected service life and replacements parts may become difficult to source, so replacement should be considered.

Thank you for giving us the opportunity work with the District to investigate your existing infrastructure and provide recommendations. After you have had a chance to review the memo, we would be happy to discuss any of the contents with you, and make changes as required.

Sincerely.

URBAN SYSTEMS LTD. REVIEWED BY

Dane Cruickshank, P.Eng. Eric Sears, P.Eng.

cc. Mokles Rahman, District of Hudson's Hope

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APPENDIX A – SITE PHOTOGRAPHS – KENDRICK LIFT STATION

Photo 1: Access hatch. Note the lack of fall restraint system and lack of handles on the cover plates.

Photo 2: Vertical drop of approximately 1 m from ground level to first ladder iron.

Photo 3: Buildup of deleterious materials (e.g. grease, oils) on walls of well, pipes, and rails. Note corrosion of rails.

Photo 4: Clamp repair on pipe that previously leaked.

APPENDIX B – SITE PHOTOGRAPHS – ADAM STREET LIFT STATION

Photo 5: General photo of lift station.

Photo 6: Interior condition of wet well.

Photo 7: Force-main condition at platform.

APPENDIX C – STRUCTURAL ASSESSMENT

Scouten
ENGINEERING

Hudson's Hope - Structural Assessment of Two Wet Wells

Urban Systems Ltd.

File No. 272-17

January 2022

Thinking beyond.

TABLE OF CONTENTS

1.0 INTRODUCTION

Scouten Engineering was requested by Urban Systems to undertake a structural assessment of two existing sanitary wet wells located in Hudson's Hope, BC, in accordance with our proposal dated October 6th, 2021.

The purpose of the assessment was to provide a professional opinion of the existing condition by physical inspection, and provide a structural condition assessment report, for the two existing sanitary wet wells. The two wet wells we assessed were:

- Kendrick Lift Station
- Adam's Lift Station

The District of Hudson's Hope provided record drawing D1 of Adam's Lift station, prepared by Stanley Associates Engineering Ltd for our reference prior to the site visit. The drawing, which was prepared in 1995, is attached in Appendix A.

Yamini Komath from Scouten Engineering visited the sites and inspected the condition of the wet wells by physically entering the confined spaces on November 9th, 2021. Copies of some of the photographs taken during the inspection are attached in Appendix C and D. Our inspection included a visual review and survey of the interior of the wet wells to identify visually obvious signs of deterioration and, a hammer-tap survey of concrete wet well walls to determine areas of concrete delamination and deterioration.

2.0 EXISTING STRUCTURES

2.1 KENDRICK LIFT STATION

The Kendrick lift station is located near the Dudley Drive and Holland Street intersection in Hudson's Hope, BC.

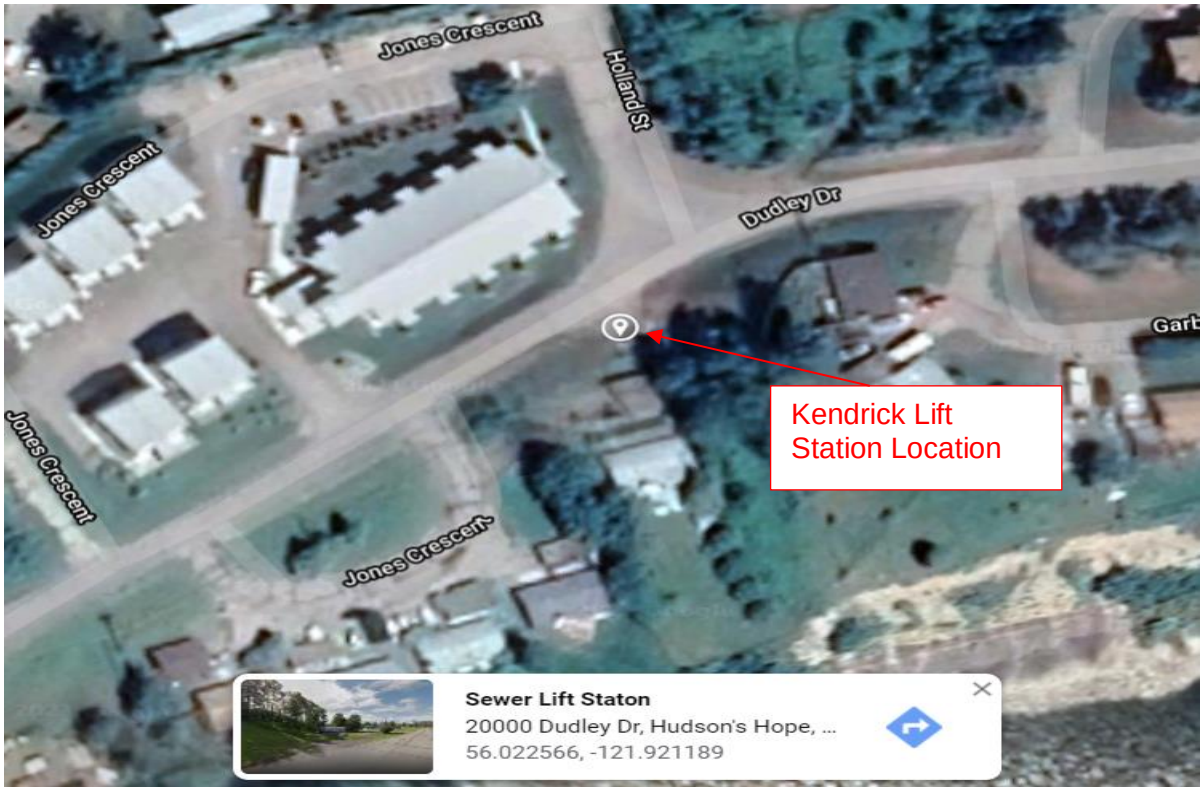


Figure 1: Aerial photograph of the Kendrick Lift Station location.

The wet well at this lift station, constructed in 1967, consists of precast concrete circular rings and cover slab. The wet well is relatively small with an inside diameter of approximately 6 feet (1.83 metres) and is 17 feet deep (5.18 metres). The record drawing S3 of Kendrick Lift station provided by District of Hudson's Hope is attached in Appendix B.

Record drawings similar to the Dudley Drive lift station were provided by the District of Hudson's Hope for our reference before the assessment.

A rectangular steel manhole cover provides access for maintenance. There are ladder irons attached to the well interior, spaced 16 inches on centre. The wet well cover and access are at ground level.

2.2 ADAM'S LIFT STATION

The Adam's lift station is located on Adam's Street, Hudson's Hope, BC.

Figure 2: Aerial photograph of the Adam's Lift Station location.

From the record drawings and the invoices provided by the District of Hudson's Hope, we assume the wet well was constructed in 1996.

The lift station consists of a Fiberglass Reinforced Plastic (FRP) wet well in a single, factory fabricated unit. The FRP well unit includes a cover and maintenance access hatch. The access for maintenance inside the well is provided by a heavy-duty aluminum ladder with ladder rungs spaced at approximately 12 inches on centre.

The wet well includes a galvanized steel framed service platform with fiberglass grating at a depth of approximately 15 feet from the top of the well to allow for servicing of equipment and bar screen cleaning.

3.0 CONDITION ASSESSMENT

3.1 KENDRICK LIFT STATION

Wastewater from the wet well was not fully pumped out at the time of inspection. We were therefore unable to inspect the base of the wet well. Visual inspection and hammer tapping was carried out on the concrete well walls to identify any possible deterioration. The following observations were noted during our assessment;

- The hammer tapping, when struck against the precast concrete walls, gives off a high-pitched ringing sound shows no delamination in the concrete.
- The ends of the ladder irons connected to the well walls were observed to be corroded
- No penetration of ground water into the well was observed at the time of inspection. However, cracks previously sealed with bitumen mastic were noted at the topmost precast unit.
- The precast units were in place with no significant displacement.
- The sand-cement mortar seals between the precast units and grouting around the pump attachment to the walls were observed to be in good condition except some minor spalling in localized areas.
- No carbonated or damaged concrete was observed during the inspection.
- Grease build up around the bottom precast unit, ladder irons, and around the pumps was noted which can affect the operation of floats.
- Some spots of brown rust staining distributed across the inside face of the wet well walls (approximately 5 to 6 locations). There did not appear to be any structurally significant damage in the areas of staining.

The major issues normally found in concrete wet wells are corrosion and deterioration of concrete. Constant humidity, temperature changes and the effects of salts dissolved in water mainly contribute to the cracking and deterioration of concrete. Considering all these, the overall condition of the wet well was observed to be good at the time of inspection.

Following our site visit we received some photographs of the bottom of the wet well from District of Hudson's Hope, following the removal of most of the water from the well.

See Photos 7 and 8 in Appendix C.

There did not appear to be any signs of visible structural damage. However, the inside surfaces of the well structure were mostly concealed behind a layer of sanitary sewage deposits. Therefore, our structural assessment of the base of this wet well is inconclusive.

3.2 ADAM'S LIFT STATION

We were unable to inspect the base of this wet well during our inspection as the well was not fully pumped out. We were able to inspect the portion of wet well from the service platform upwards and the following observations were noted during our assessment;

- Minor corrosion at the connection of the ladder to well walls.
- The platform was observed to be in good condition

Typically, polyester resins in FRP are good at resisting the corrosive effects of most acids found in sewage and chlorinated environments but do not withstand exposure to caustic chemicals as well. The wet well at Adam's lift station was observed to be in good condition.

4.0 RECOMMENDATIONS

During the inspection, Scouten Engineering was unable to assess the existing condition of the base of the wet wells as they remained partially filled with water. We recommend having the wet wells fully pumped out to expose the base of each well and a follow up structural engineering inspection completed.

Sewage pump stations are subjected to several chemicals such as hydrogen sulphide gas which can cause corrosion to exposed steel components over short and long periods of time. If left untreated, wet well structures can become unsafe and or lose their water tightness which can result in environmental impacts. Over time, corrosion and other wear-and-tear can occur, requiring maintenance works to be conducted.

During our assessment of the Kendrick wet well, there did not appear to be any immediate structural issues which need to be addressed. We did record some minor spalling (See photo 4). However, the concrete surface around these areas of damage appeared stable without signs of cracks propagating from these locations, loose concrete debris, or rust staining that would accompany exposed reinforcement. The condition of the ladder irons, exposed to chemicals, are prone to corrosion and may result in further deterioration in the future. To arrest this deterioration, it is recommended to clean the ladder irons by wheel wire brush or by other means and apply a protective coating to protect them from further corrosion.

We reviewed the photographs received of the base of the Kendrick wet well. Most of the surfaces to the well base were concealed behind sanitary sewer deposits. We therefore recommend next time the well is drained, surfaces to the base of the wet well are cleaned to better expose their condition. This cleaning should be timed to allow a structural engineer to record the condition of the surfaces in person.

The Kendrick wet well has a remaining life of approximately 20 years.

The Adam's wet well was observed to be in good condition at the time of inspection. Generally, wet wells should be pumped out and cleaned 1-2 times a year, or more often if

necessary, to prevent solids and grease build-up. Build-up of solids can create odors and damage to pump equipment. We recommend cleaning the wet well at least once a year.

The Fiberglass Reinforced Plastic well has an estimated remaining life of 75 years.

Regular inspection and preventative maintenance of pumping stations will aid continued, reliable operation of the entire system. Inspection and cleaning of pumps (submersible and dry) and other equipment should be performed at least quarterly.

We trust this report and its appendices provide you with the necessary information at this stage, but if you have any questions or require additional information of any kind, please feel free to call.

Sincerely,

Prepared by:

SCOUTEN ENGINEERING
Yamini Komath M.Tech., EIT – Project Engineer
ykomath@scoutenengineering.com

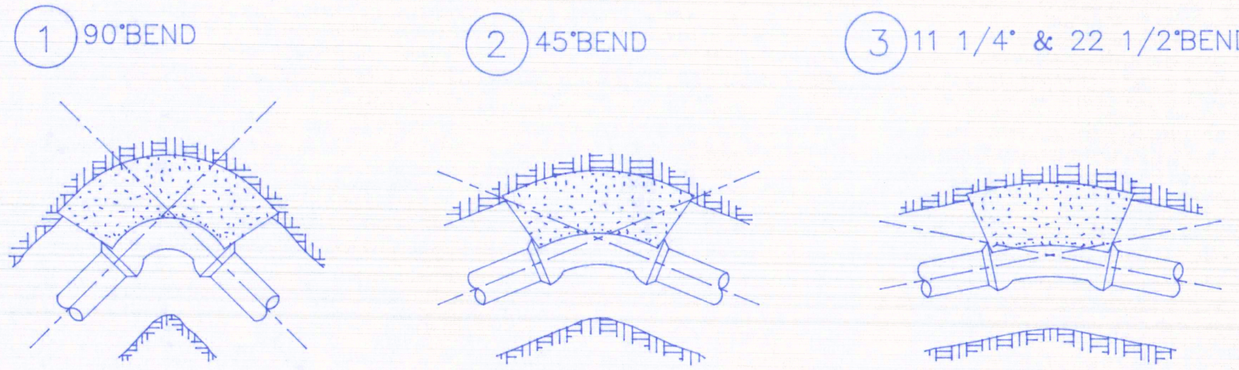
Reviewed by:

EGBC Permit to Practice No.: 1000556

SCOUTEN ENGINEERING
Ben Crimp P.Eng., MIStructE. – Senior Structural Engineer
bcrimp@scoutenengineering.com

APPENDIX A: RECORD DRAWINGS FOR ADAM'S LIFT STATION

Scouten
ENGINEERING



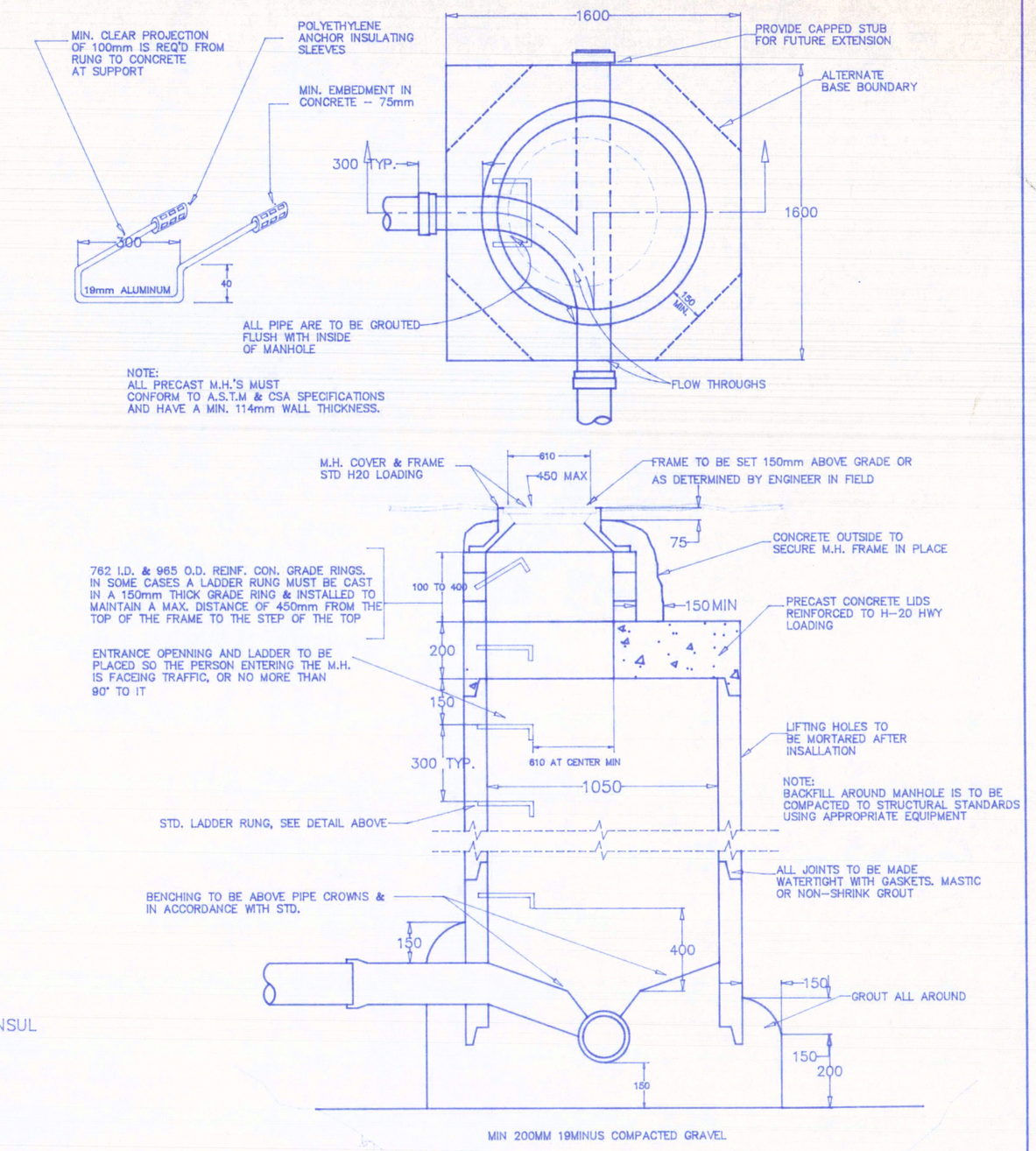
NOTES:
1.DESIGN ASSUMPTION
a.HYDRAULIC PRESSURE 1.38MPa
b.SOIL BEARING 100kPa (MEDIUM SOFT CLAY)
2.CONCRETE SHALL BE SULPHATE RESISTANT
3.TEMPORARY BLOCKING MUST BE APPROVED BY THE ENGINEER
4.2 PLY OF 0.15mm POLYETHYLENE SHALL BE PLACED BETWEEN PIPE AND CONCRETE
5.CONCRETE SHALL BE 20MPa AT 28 DAY STRENGTH, MAX.SLUMP 75mm

BEARING AREA OF BLOCKS
(CONCRETE AREAS IN SQUARE METRES)

	PIPE SIZE	100	150	200	250
TYPE OF FITTING	1	0.3	0.5	0.9	1.4
	2	0.2	0.3	0.5	0.6
	3	0.1	0.2	0.3	0.4

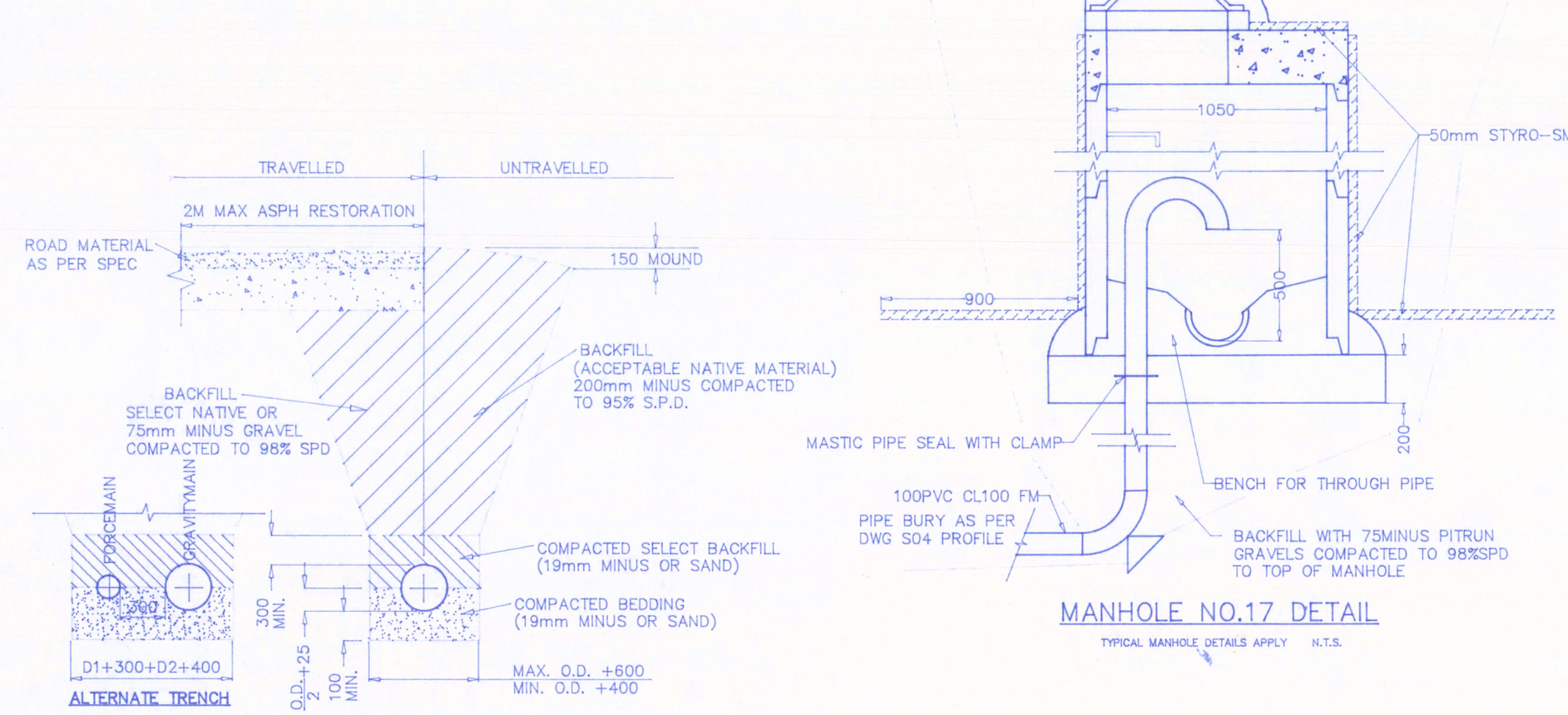
FORCEMAIN FITTING THRUST BLOCK DETAILS

NTS



MANHOLE DETAIL TYPICAL

N.T.S.

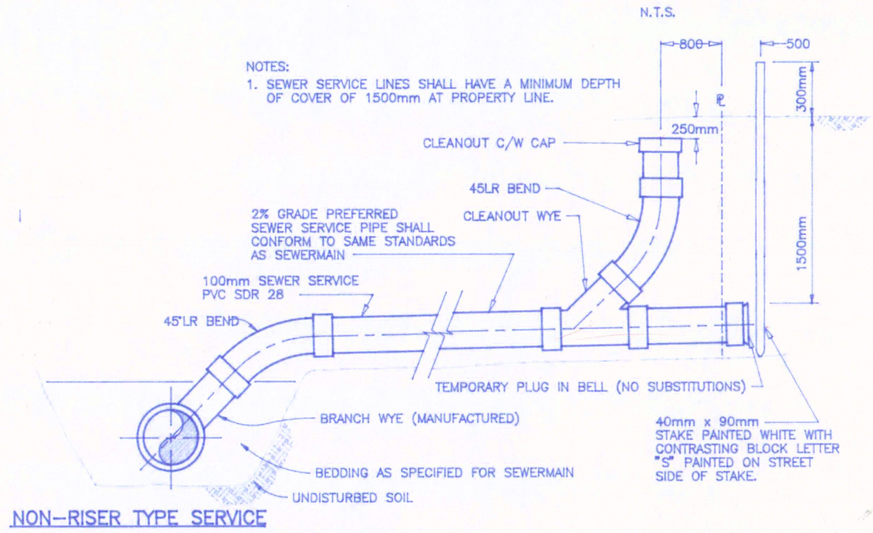


TRENCH DETAIL

N.T.S.

MANHOLE NO.17 DETAIL

TYPICAL MANHOLE DETAILS APPLY N.T.S.



SEWER SERVICE CONNECTION TYPICAL

NTS

NO.	DATE	DESCRIPTION	BY	APPROVED
1	–	–	–	–

REVISIONS

NO.	DESCRIPTION	DATE	APPROVED
6	MICROFILMED		
5	PLAN OF RECORD	11-15-95	
4	APPROVAL FOR CONSTRUCTION	08-17-95	
3	FOR TENDER	07-05-95	
2	FOR APPROVAL	03-02-95	
1	PRELIMINARY	02-13-95	

DRAWING STATUS

SEAL: PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. POLL — Jan 26/96

Stanley
STANLEY ASSOCIATES ENGINEERING LTD.

COMPUTER AIDED DESIGN & DRAFTING AUTOCAD

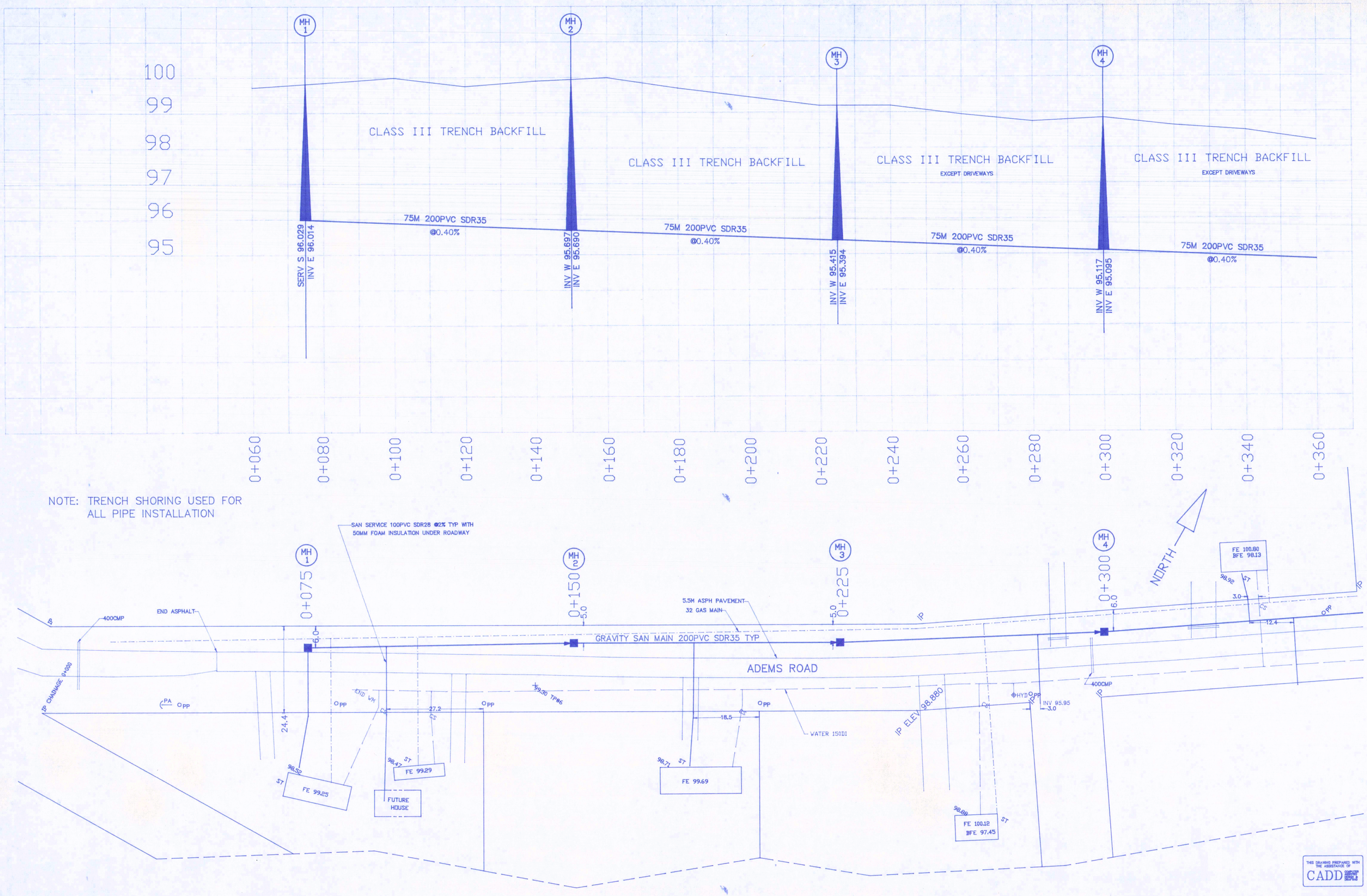
DESIGNED BY LGT/MAP	APPROVED BY MAP
DRAWN BY LGT	CHECKED BY –
SCALE AS NOTED	
PLOT DATE 011596	

CLIENT: DISTRICT OF HUDSON'S HOPE

TITLE: ADAMS ROAD
SANITARY SEWER
CONNECTION DETAILS

DATE DRAWN 06-16-95
SHEET NO. 5 OF 5
JOB NO. 90-71900
REVISION – / STATUS NO 5
DRAWING NO D1

B-1022



No.	DATE	DESCRIPTION	BY	APPROVED

REVISIONS

No.	DESCRIPTION	DATE	APPROVED
6	MICROFILMED		
5	PLAN OF RECORD	11-15-95	
4	APPROVAL FOR CONSTRUCTION	08-17-95	
3	FOR TENDER	07-05-95	
2	FOR APPROVAL	06-16-95	
1	PRELIMINARY		

ISSUE DATES

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. A. PARKER
Jan 26/96

Stanley

DESIGN MAP/LGT	APPROVED MAP
DRAWN LGT	CHECKED
SCALE HOR. – 1:500 VERT. – 1:50	
PLOT DATE: 012596	

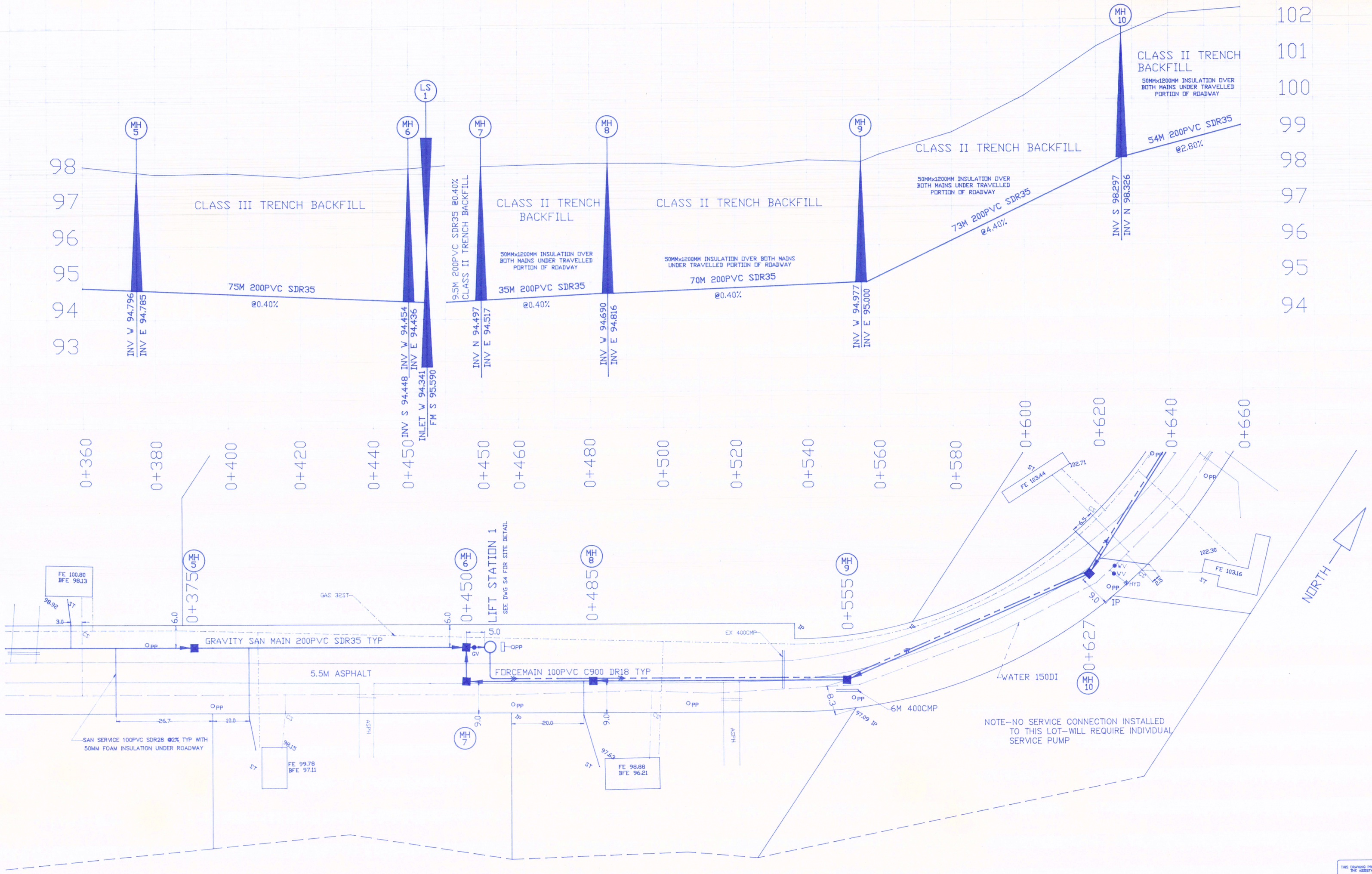
DISTRICT OF HUDSON'S HOPE

ADEMS ROAD
SANITARY SEWER

DATE	06/01/95
SHEET No.	
JOB No.	90-719-00
REVISION No. / ISSUE No.	5
DRAWING No.	S1

THIS DRAWING PREPARED WITH THE ASSISTANCE OF CADD COMPUTER AIDED DESIGN & DRAFTING SERVICES

B-1022



THIS DRAWING PREPARED WITH THE ASSISTANCE OF CADD

No.	DATE	DESCRIPTION	BY	APPROVED

REVISIONS

No.	DESCRIPTION	DATE	APPROVED
6	MICROFILMED		
5	PLAN OF RECORD	11/15/95	
4	APPROVAL FOR CONSTRUCTION	07/05/95	
3	FOR TENDER	07/05/95	
2	FOR APPROVAL	06/16/95	
1	PRELIMINARY		

ISSUE DATES

PROFESSIONAL ENGINEER OF BRITISH COLUMBIA M. A. POLL

Jan 26/96

Stanley

DESIGN	MAP/LGT
APPROVED	MAP
DRAWN	LGT
CHECKED	
SCALE	HOR.- 1:500 VERT.- 1:50
PLOT DATE: 012596	

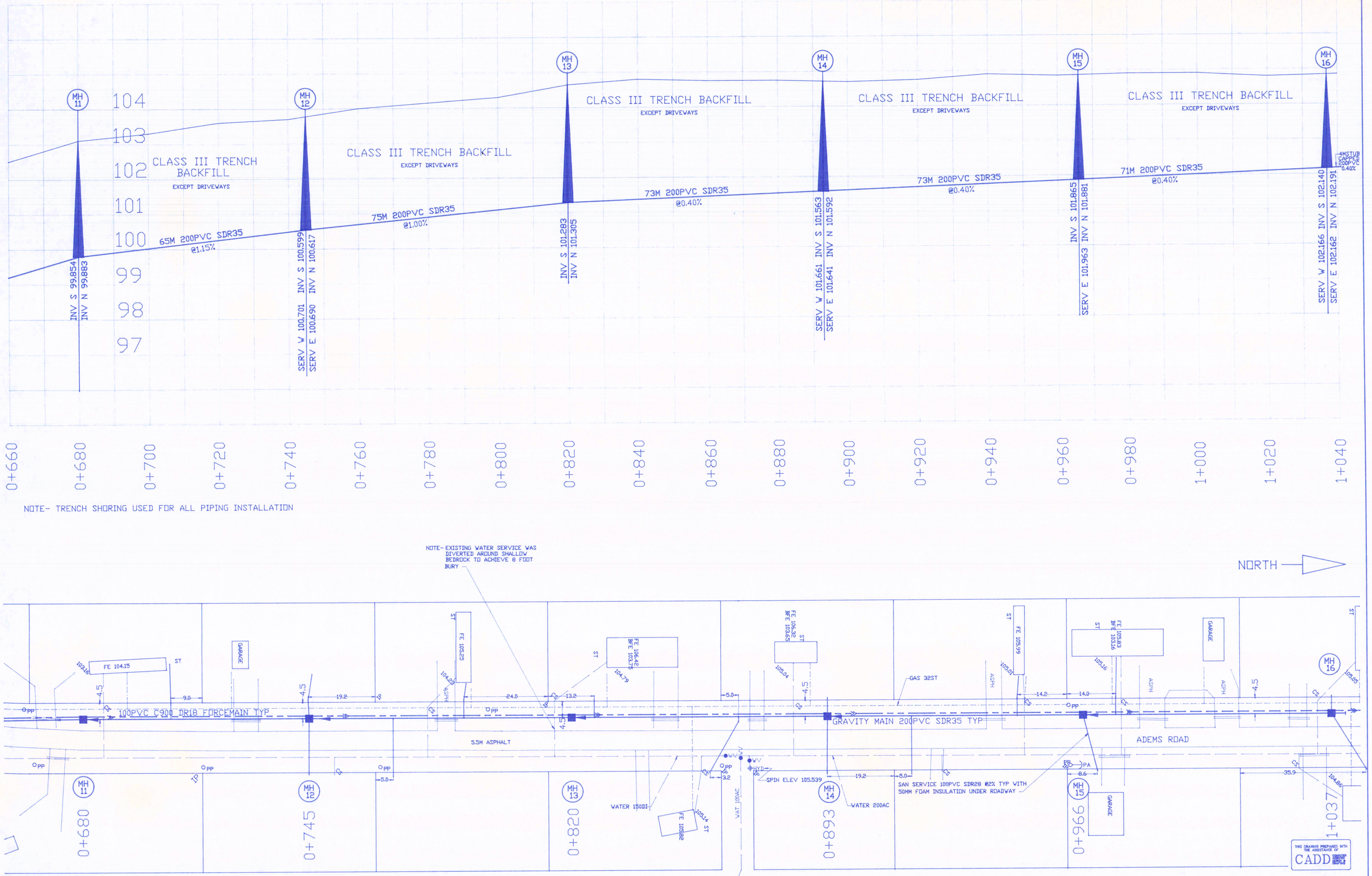
DISTRICT OF HUDSON'S HOPE

ADEMS ROAD

SANITARY SEWER

DATE	06/01/95
SHEET No.	2 OF 5
JOB No.	90-719-00
REVISION No.	5
ISSUE No.	
DRAWING No.	S2

B-1022



NOTE- TRENCH SHORING USED FOR ALL PIPING INSTALLATION

No.	DATE	DESCRIPTION	BY	APPROVED

REVISIONS

No.	DESCRIPTION	DATE	APPROVED
6	MICROFILMED		
5	PLAN OF RECORD	11/15/95	
4	APPROVAL FOR CONSTRUCTION	08/17/95	
3	FOR TENDER	07/05/95	
2	FOR APPROVAL	06/16/95	
1	PRELIMINARY		

ISSUE DATES

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M.A. POOL

Jan 26/96

Stanley

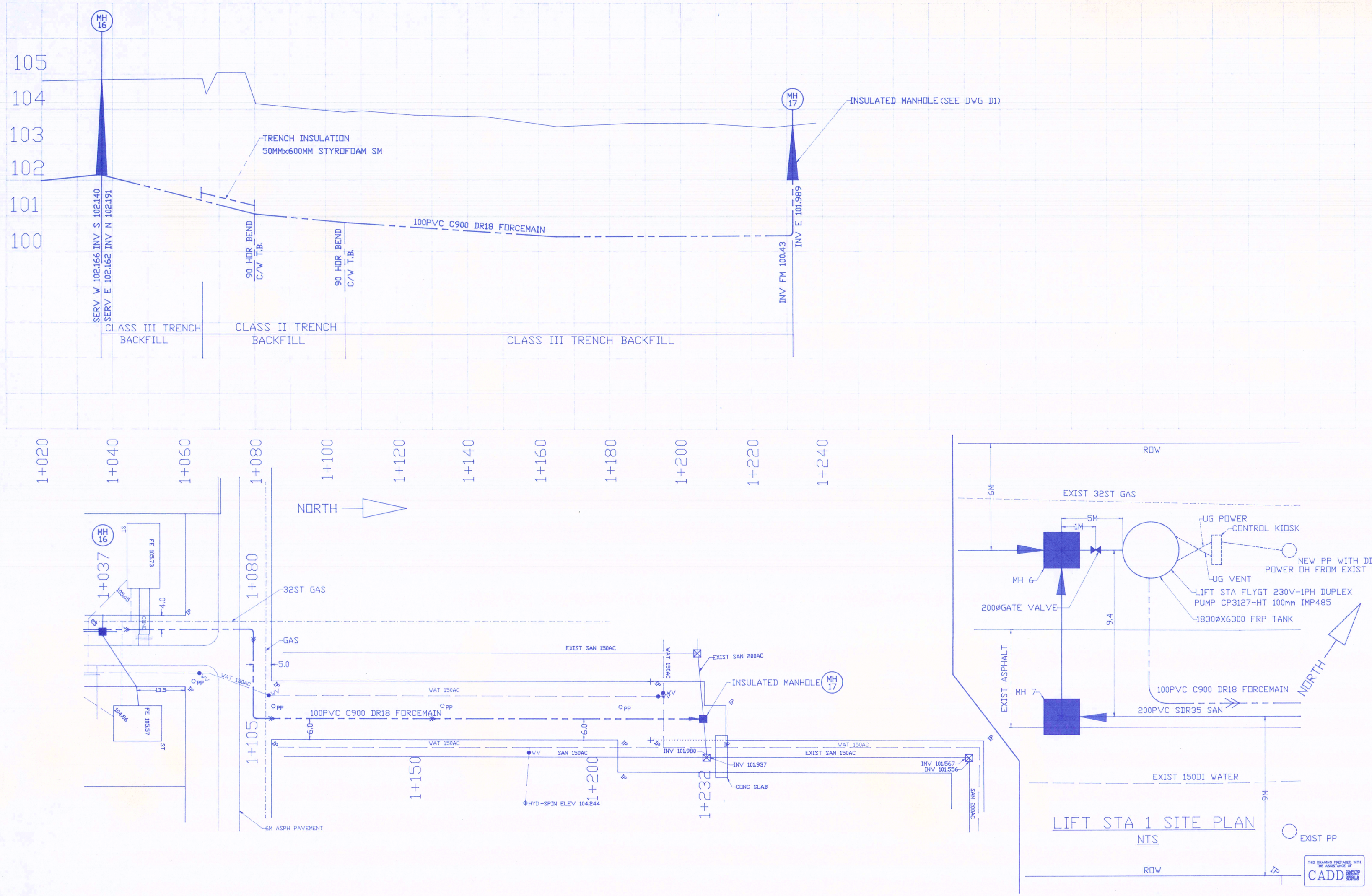
DESIGN MAP/LGT	APPROVED MAP
DRAWN LGT	CHECKED
SCALE HOR 1:500 VERT 1:50	
PLOT DATE: 012596	

DISTRICT OF HUDSON'S HOPE

ADEMS ROAD SANITARY SEWER

DATE	06/01/95
SHEET No.	3 OF 5
JOB No.	90-719-00
REVISION No.	5
ISSUE No.	
DRAWING No.	S3

B-1022



No.	DATE	DESCRIPTION	BY	APPROVED

REVISIONS

No.	DESCRIPTION	DATE	APPROVED
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5	PLAN OF RECORD	12/01/95	
4	APPROVAL FOR CONSTRUCTION	08/17/95	
3	FOR TENDER	07/03/95	
2	FOR APPROVAL	06/16/95	
1	PRELIMINARY		

ISSUE DATES

Jan 26/96

Stanley

DESIGN	MAP/LGT
APPROVED	MAP
DRAWN	LGT
CHECKED	
SCALE	HOR. -1:500 VERT.- 1:50
PLOT DATE: 012596	

DISTRICT OF HUDSON'S HOPE

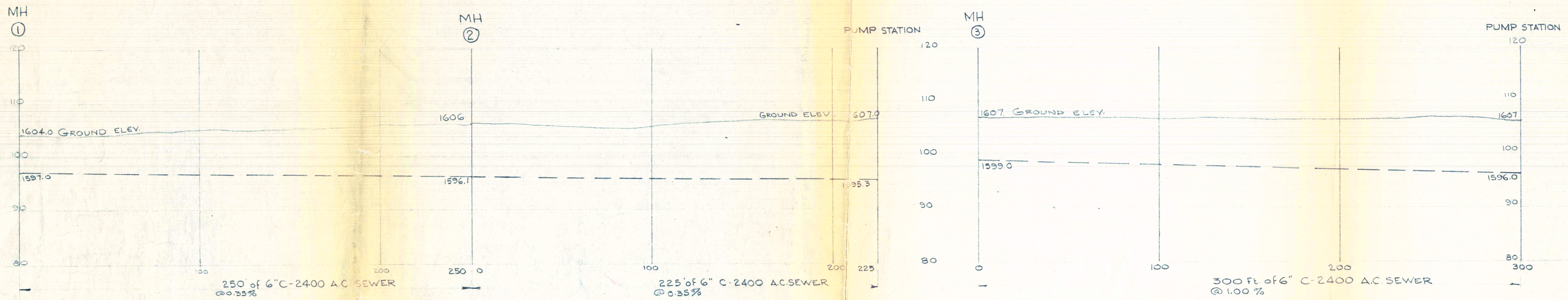
ADEMS ROAD
SANITARY SEWER

DATE	06/16/95
SHEET No.	4 OF 5
JOB No.	90-719-00
REVISION No.	5
ISSUE No.	
DRAWING No.	S4

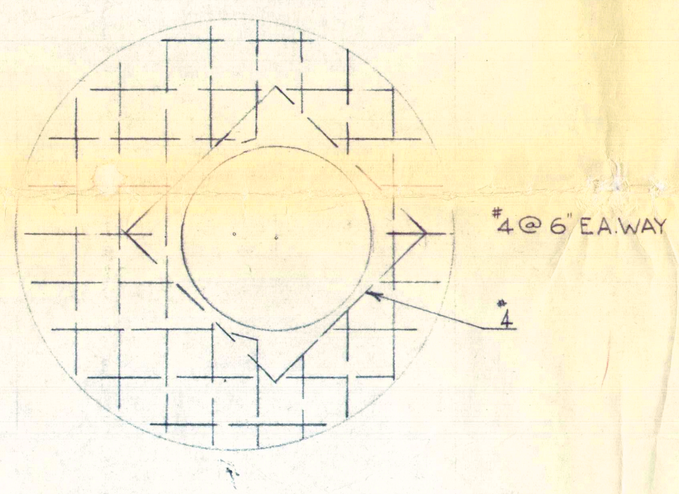
B-1022

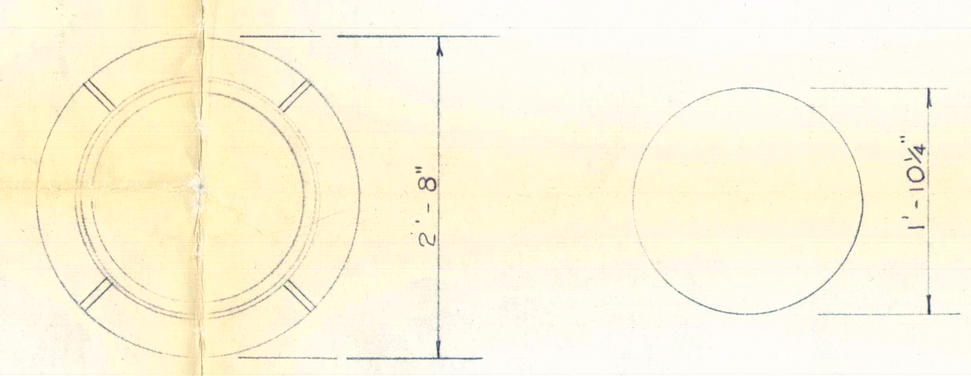
APPENDIX B: RECORD DRAWINGS FOR KENDRICK LIFT STATION

Scouten
ENGINEERING



1" = 30' Hor.
1" = 10' Ver.



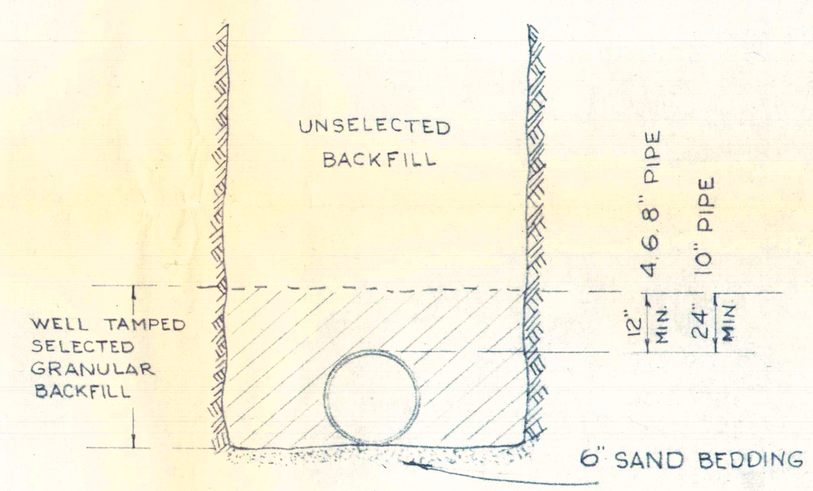


FRAME
MAINLAND FDY. No. 3R13 (HEAVY DUTY)

COVER
MAINLAND FDY. No. 3R12A

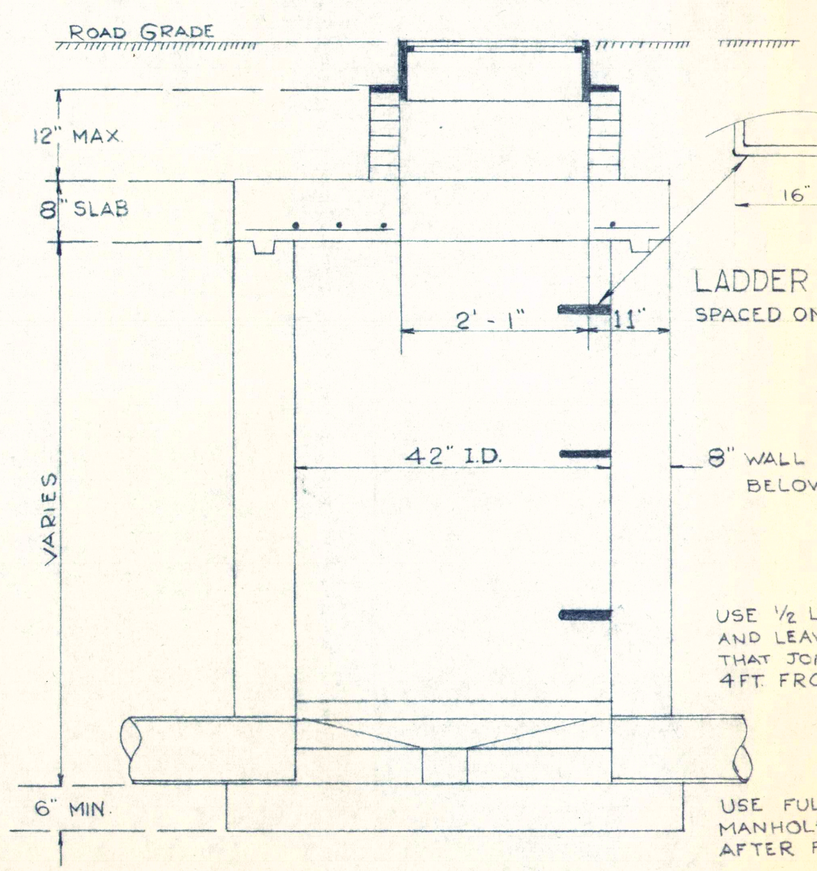
OR APPROVED EQUAL

C.I. MANHOLE FRAME & COVER



ORDINARY BEDDING

SPECIAL BEDDING CONDITIONS TO BE DETERMINED BY THE ENGINEER



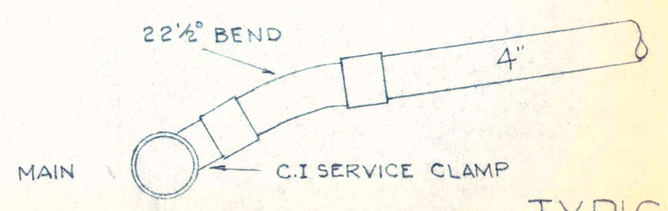
MANHOLE DETAIL

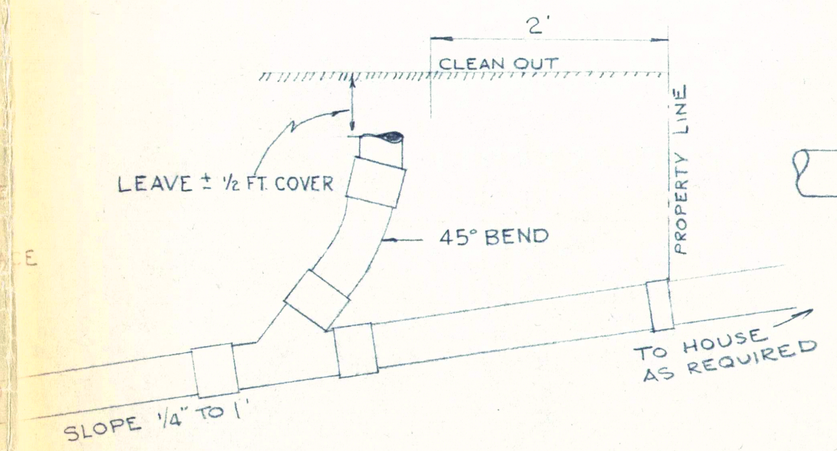
¾" = 1'-0"

Note: Precast Concrete Manhole will be accepted as alternate.

NOTES:

CONCRETE TO BE 3000# STRENGTH 28 DAYS
REINFORCING - INTERMED. GRADE DEFORMED BARS WITH MIN 1½" CLEAR TO CONCRETE FACE
BASE SLAB REINFORCING TO BE DETERMINED BY THE ENGINEER IF GROUND CONDITIONS REQUIR
BRICKING TO BE CONCRETE BRICKS LAID UP SOLID IN CEMENT MORTAR AND PARGED ON EXT. FA E

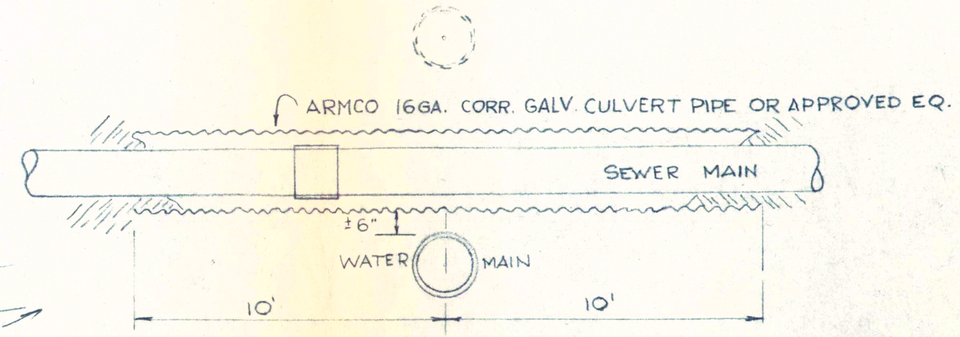




NOTE: INSTALL CLEANOUT ASSEMBLY WHEN MAIN TO PROPERTY LINE DISTANCE OVER 10 FEET

NTS

TYPICA SEWER SERVICE DETAIL



PROTECTION REQUIRED AT PIPE CROSSINGS

NTS

USE 12" DIA. CULVERT PIPE FOR 6" SEWER
" 15" " " 8" "
" 18" " " 10" "

No.	DATE	DESCRIPTION

REVISIONS

RHONE & IREDALE ARCHITECTS
1095 WEST 7TH AVENUE
VANCOUVER 8, B.C.
TELEPHONE: RE. 6-5581

CONSULTANT

W. ALLAN PEER & ASSOCIATES LTD.
CONSULTING ENGINEERS
649 BASTION ST., VICTORIA

DRAWN	CHECKED	
C.G.C.		
DATE 17 APRIL 1964	STRUCT.	ELECT.
SCALE As Shown	MECH.	PLUMB.

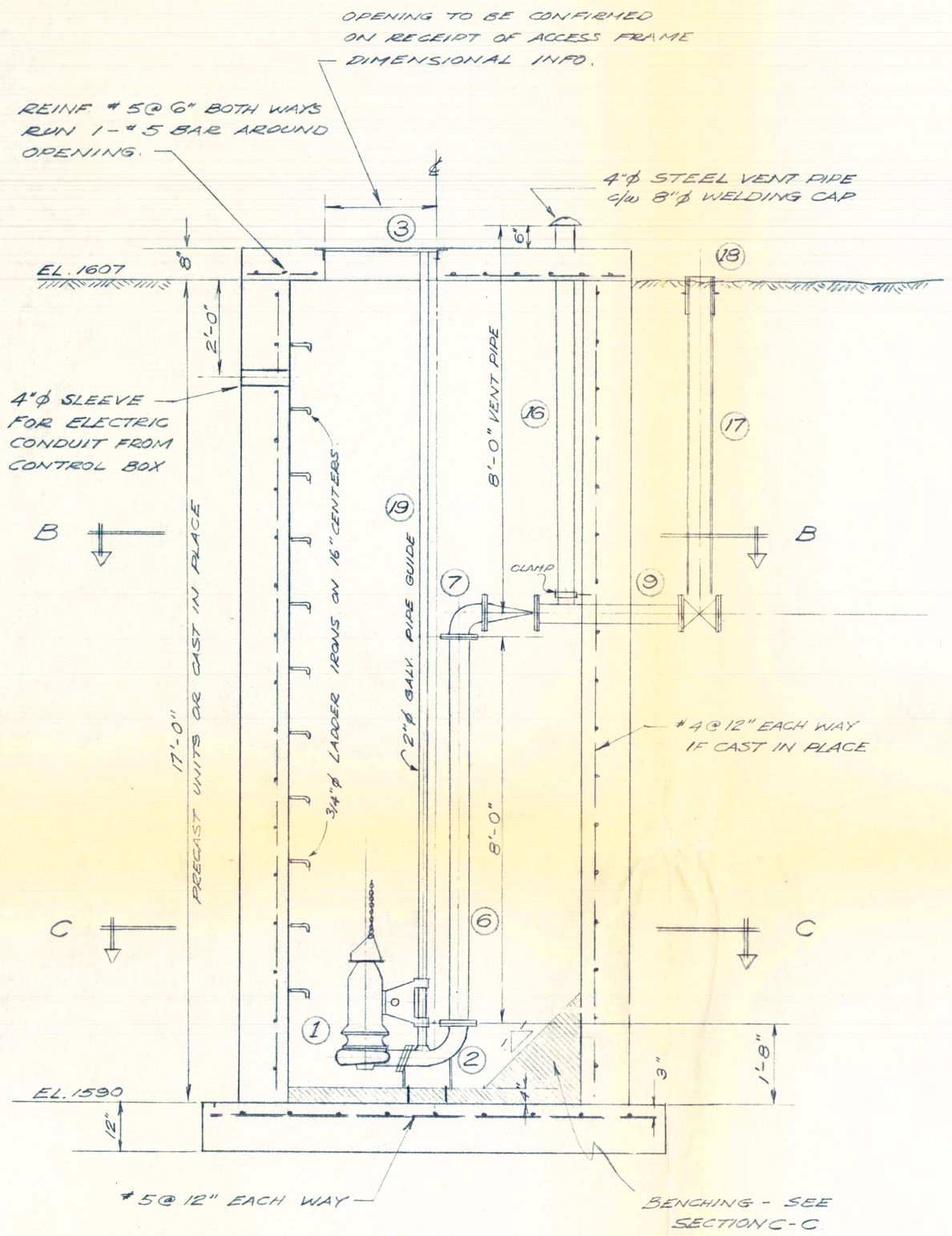
BRITISH COLUMBIA HYDRO and POWER AUTHORITY
CONSTRUCTION of 20 HOUSING UNITS at HUDSON HOPE B.C.

DRAWING TITLE

SEWERAGE SYSTEM DETAILS

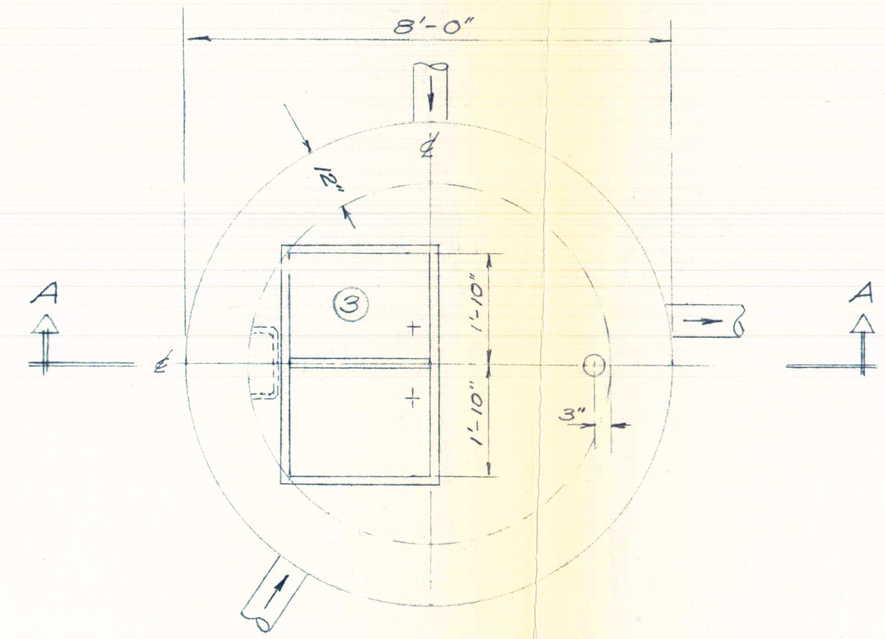
SHEET No.	PROJECT No.
S-2	6406

B-1055

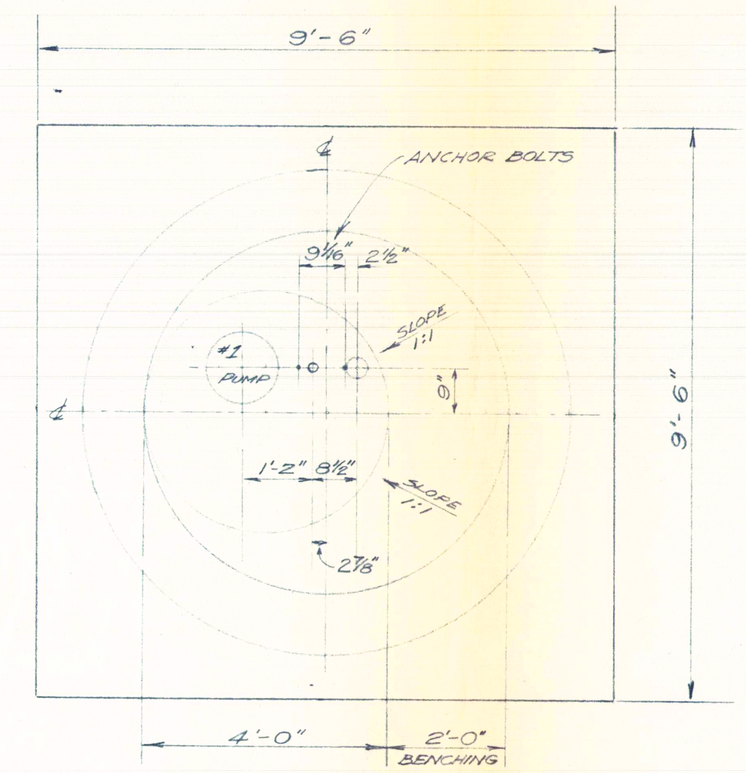


SECTION A-A

SCALE 1/2" = 1'-0"

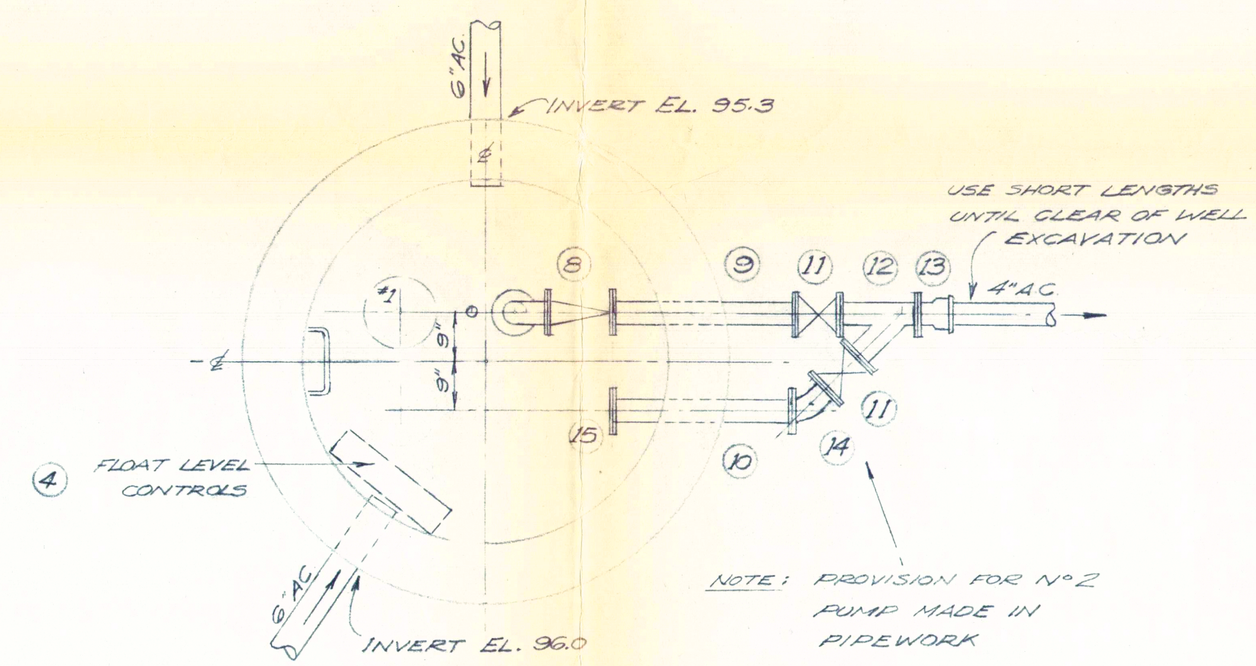


PLAN AT TOP



SECTION C-C

SHOWING BASE SLAB



SECTION B-B

BILL OF MATERIAL

ITEM	QTY.	DESCRIPTION
*1	1	FLYGT CP100 4" 220V 3ϕ 60 cycle 1750 r.p.m. Submersible pump c/w cable and chain.
*2	1	C-24537 M 4" discharge connection
*3	1	B-21715 M access frame complete
*4	3	ENP 10 FLYGT level regulators
*5	1	MODEL 23100-9T automatic, weather-proof motor control panel
6	1	4" nipple flg. x flg. x 3'-0" long sched. 40 steel
7	1	4" flg. x flg. 90° elbow
8	1	4" flg. x flg. swing check valve
9	1	4" nipple flg. x flg. x 3'-0" long sched 40 steel
10	1	4" — ditto — x 2'-11 3/16" — ditto —
11	2	4" Gate valves NRS flg. x flg. c/w sq. hd. operating nut
12	1	4" - 45° flanged lateral
13	1	4" flg. x tercotite adapter
14	1	4" flg. x flg. 45° bend
15	1	4" blind flg.
16	1	4" plain ended x 8'-0" long sched. 40 steel vent
17	2	6" no-co-rode x 7'-0" long
18	2	NT type valve boxes
19	1	2" dia galv. iron pipe x 18' long (one piece cut to suit)

NOTES:

* These items as per Mine Equipment Co. Ltd proposal VA 762

All fittings Cast Iron 125# flg. except as noted.

NOTE: BACKFILL AROUND WET WELL TO BE WELL COMPACTED TO ENSURE SAFE BEDDING FOR MAINS CONNECTED THERETO. USE 1/2 LENGTHS IN CONNECTING TO WET WELL.

(5) ELECTRICAL CONTROL PANEL TO BE MOUNTED ON POWER POLE IMMEDIATELY ADJACENT TO PUMP STATION AND CONDUIT LED INTO CHAMBER THRU 4" SLEEVE SHOWN.

FOR LOCATION OF PUMP STATION SEE DRAWING S1 "SITE PLAN"

No.	DATE	DESCRIPTION

REVISIONS

RHONE & IREDALE ARCHITECTS

1095 West 7th Avenue
Vancouver 8, B.C.
Telephone: RE. 6-5581

CONSULTANT

DRAWN C.G.C.	CHECKED
DATE 17 April 1964	STRUCT. / ELECT.
SCALE 1/2" = 1'-0"	MECH. / PLUMB.

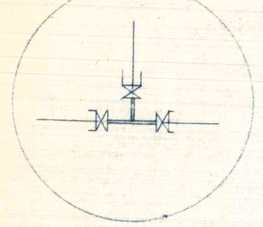
BRITISH COLUMBIA HYDRO and POWER AUTHORITY
CONSTRUCTION of 20 HOUSING UNITS at HUDSON HOPE B.C.

DRAWING TITLE

SEWAGE PUMPING STATION

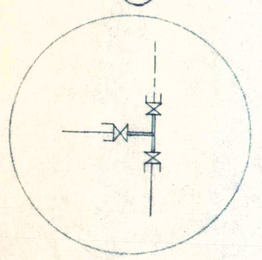
SHEET No.	PROJECT No.
S-3	6406

①



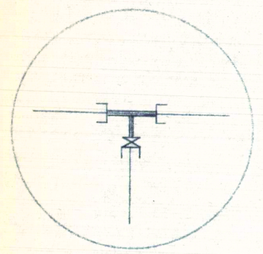
1 - 8"x 8"x 8" flg. tee
3 - 8" flg x hub gate valves
3 - Valve box for 8" valve - 9' bury

②



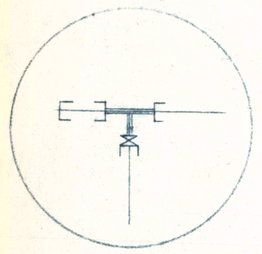
1 - 8"x 8"x 4" flg tee
2 - 8" flg x hub gate valves
1 - 4" flg x hub gate valves
3 - Valve box for 9' bury

③



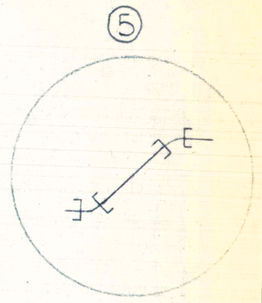
1 - 4" hub x hub x 2" I.P.S. Tee
1 - 2" I.P.S. galv. nipple x 0'-6"
1 - 2" gate valve
1 - Valve box for 9' bury

④



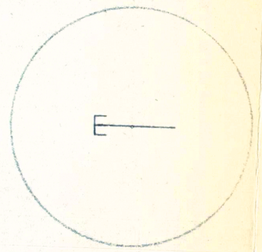
1 - 4" hub x 4" hub x 2" I.P.S. tee
1 - 2" I.P.S. galv. nipple x 0'-6"
1 - 2" gate valve
1 - valve box for 9' bury
1 - Cap for 4" A.C. Pipe

⑤

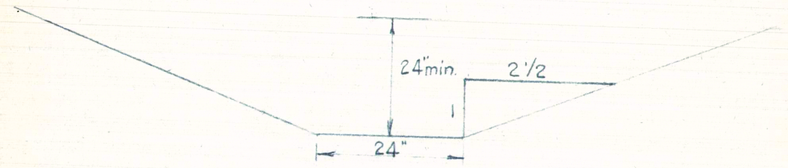


2 - 8" hub x hub 45° Bend

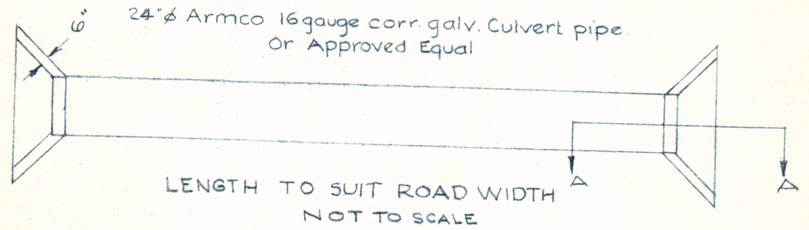
⑥



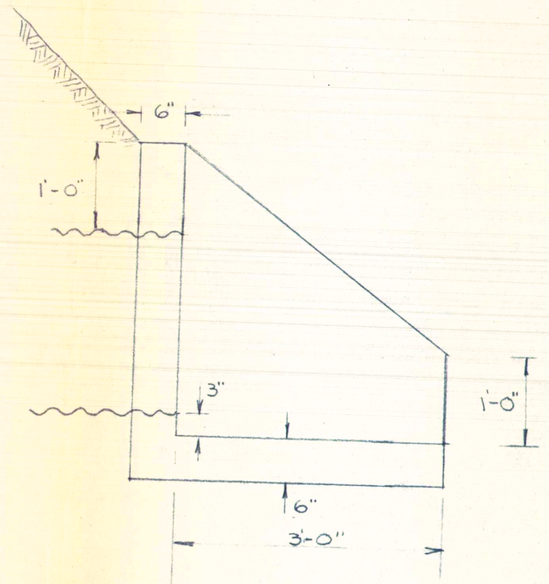
1 - Cap for 8" A.C. pipe



TYPICAL DRAINAGE DITCH
MIN. DEPTH 24"
WITH SIDE SLOPES @ 2 1/2 TO 1

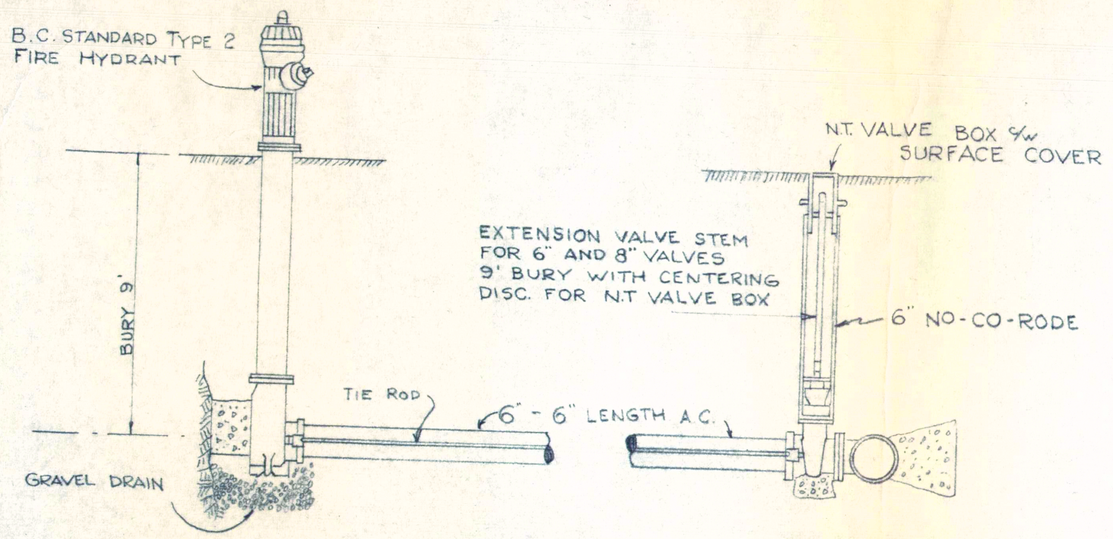


LENGTH TO SUIT ROAD WIDTH
NOT TO SCALE



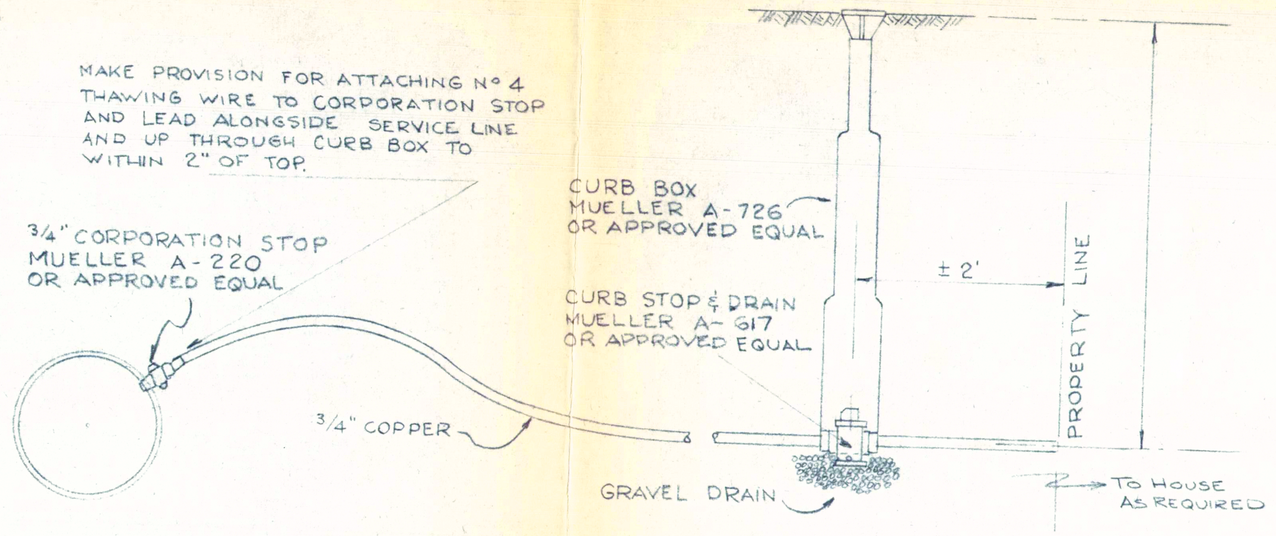
REINFORCE WALLS & SLAB WITH 3/8" BARS @ 9" EACH WAY

SECTION - A-A



TYPICAL ARRANGEMENT OF FIRE HYDRANT
INSTALLATION
NOT TO SCALE

1 - 8" Hub x 8" Hub x 6" flg. tee
1 - 6" Hub x flg. gate valve
1 - valve box for 9' bury
1 - B.C. Standard #2 Fire Hydrant
(for 9' bury)

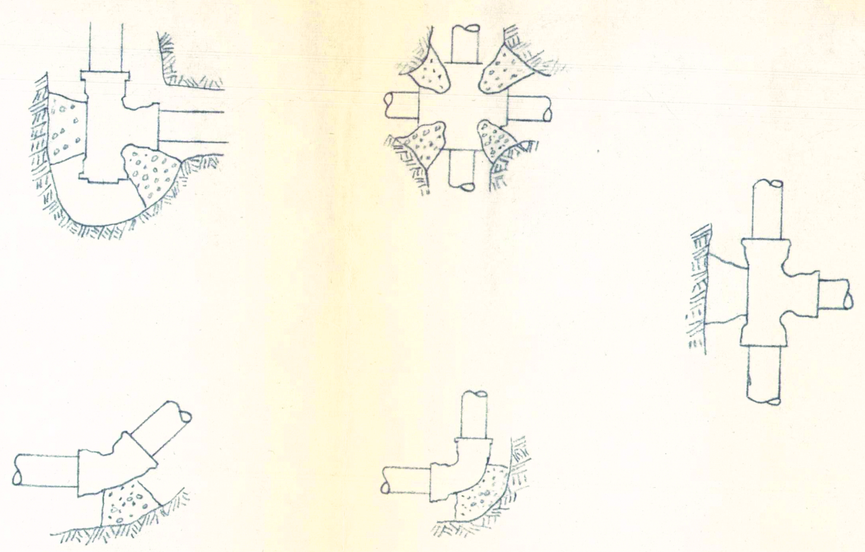


TYPICAL ARRANGEMENT OF HOUSE SERVICE CONNECTION

NOTE: FOR SERVICES LARGER THAN 3/4" ON 6" MAIN, 1" ON 8" MAIN } USE DOUBLE STRAP SERVICE CLAMPS

THRUST BLOCKING REQ'D

CLASS	PIPE	TEES	BENDS		
			90°	45°	22 1/2°
150	8"	8 SF	11 SF	6 SF	3 SF
150	6"	4 1/2 SF	6 1/2 SF	3 1/2 SF	2 SF



NOTE: ABOVE VALUES BASED ON SOIL BEARING LOAD OF 1000#/SF FOR SANDY SOILS.

FOR SOFT TO MED CLAY - INCREASE 50%

FOR SAND AND GRAVEL - DECREASE 30%

FOR CROSSES USE 45° BEND VALUE IN EACH QUADRANT.

WHERE PIPE SIZE DIFFERS IN ANY ONE FITTING - USE VALUE FOR MAX SIZE

USE TEE VALUE ON CAPPED MAINS

No.	DATE	DESCRIPTION

REVISIONS

RHONE & IRELAND ARCHITECTS
1095 West 7th Avenue
Vancouver 8, B.C.
Telephone: RE. 6-5581

CONSULTANT

W. ALLAN [illegible] & ASSOCIATES LTD.
CONSULTING ENGINEERS
[illegible] BAYSWATER STREET, VANCOUVER

DRAWN	CHECKED
C.G.C.	[illegible]
DATE: 17 APRIL 1964	STRUCT. / ELECT.
SCALE: As shown	MECH. / PLUMB.

BRITISH COLUMBIA HYDRO and POWER AUTHORITY
CONSTRUCTION of 20 HOUSING UNITS at HUDSON HOPE B.C.

DRAWING TITLE
WATER SYSTEM DETAIL

SHEET No.	PROJECT No.
W-1	6406

APPENDIX C: PHOTOSHEET, KENDRICK LIFT STATION

Scouten
ENGINEERING

Photo 1: General view of Kendrick Lift station wet well.

Photo 2: Vertical cracks sealed with bitumen mastic.

Photo 3: Corroded ladder irons.

Photo 4: Grease build up around the pipes and ladder irons at the bottom

Photo 5: Spalling of concrete around the pipe connection.

Photo 6: Vertical crack in the precast wall.
(Moisture around the crack and top of the wet well wall is due to snow precipitation from above)

Photo 7: Photograph from District of Hudson's Hope showing base of the wet well

Photo 8: Bottom of the wet well covered with sanitary sewage deposits.

APPENDIX D: PHOTOSHEET, ADAM'S LIFT STATION

Scouten
ENGINEERING

Photo 1: General view of Adam's Lift station wet well.

Photo 2: Minor rust stain on the ladder.

Scouten ENGINEERING
201 – 1968 Queensway Prince George BC V2L 1M2
info@scoutenengineering.com T 250.562.7050

PROJECT:	272-17	DATE:	December 10th, 2021
LOCATION:	Adam's Street, Hudson's Hope, BC		
CLIENT:	Urban Systems		
PROJECT:	Structural Assessment of Two Wet Wells		
BY:	Y.K.	PAGE:	1 of 2

Photo 3: General view of the service platform

APPENDIX D – ELECTRICAL CONDITION MEMO

EXCEED
ELECTRICAL ENGINEERING

PROFESSIONAL ENGINEERING SERVICES REPORT

DISTRICT OF HUDSON'S HOPE

LIFT STATION ASSESSMENT – KENDRICK (DUDLEY DRIVE) AND ADAM STREET LIFT STATIONS

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Date: 2022-01-21

Project 25301 | Revision 01

BACKGROUND

Exceed Electrical Engineering Ltd. ("Exceed") was retained by Urban Systems to provide an electrical assessemnt of the Kendrick and Adam Street Lift Stations in Hudson's Hope, British Columbia.

The District of Hudson's Hope is a municipality in north-eastern British Columbia, located along the Peace River, with a population of approximately 1,150 people. The District is serviced by three lift stations, Adam Street, Kendrick, and the Beattie Lift Station. The Beattie Lift Statiion has recently undergone some upgrades and is therefore not assessed for report. This report will assess the condition of both the Adam Street and Kendrick Lift Stations.

Exceed was provided photos of each lift station to perform this assessment and therefore no site visit or field work was performed by Exceed.

KENDRICK LIFT STATION

ELECTRICAL CONDITION

The Kendrick Lift Station is a duplex lift station built in 1967. This station is fed with a single phase service with no metering present, and runs two single-phase 3.9hp Flygt pumps off of across the line starters. The original design incorporated an alarm beacon and audible device inside the kiosk to alert nearby residents and/or operators of an alarm. An antenna mast and radio junction box are installed on the side of this lift station, but an alarm dialer has been installed since, likely taking over communication of alarms. It is not known what information, if any, is transmitted via radio from this lift station currently.

This condition of the kiosk including controls and all electrical systems are beyond the typical lifetime of approximately 20 years. Most recent visible upgrades appear to be the replacement of a 24V power supply (Phoenix contact Trio Power), replacement of pump starters (Schneider Electric TeSys), and addition of a Barnett CV3 alarm dialer.

The Programmable Logic Controller ("PLC") is an Automation Direct Koyo DirectLOGIC 06, released in the 1990's. Support and replacement parts for these PLC's are difficult to obtain as they are no longer manufactured in large quantities. Replacements for this PLC may soon be unattainable.

Four float switches are located in the wet well and are tied back to the PLC for pump controls. These floats provide a high level alarm, lead pump start signal, lag pump start signal, and a pump stop signal.

Given the age of this station, the alarms are very simplistic as they would normally actuate an alarm beacon and signalling device within the kiosk. Someone nearby would notice the flashing beacon or hear the signal and notify the District Operators. An alarm dialer appears to have been added and it is possible that the flashing beacon and signalling device have since been bypassed as alarms will be sent via the dialer.

A receptacle to connect a portable generator is mounted to the side of the kiosk. There does not appear to be a manual transfer switch anywhere inside the kiosk.

RECOMMENDED UPGRADES

The electrical for this lift station is beyond its end of life and has little for communications and/or controls. It is recommended to provide a new kiosk complete with modern controls infrastructure, alarming, back-up generator readiness, modern instrumentation, and back-up system in the event of PLC failure.

The approximate cost for a new electrical kiosk with control system is upwards of $110,000. This price is subject to features chosen such as kiosk construction material, kiosk insulation, odour removal, automation features, remote access, etc... This excludes engineering, commissioning, and the provision of a permanent standby generator.

ADAM STREET LIFT STATION

ELECTRICAL CONDITION

The Adam Street Lift Station was built around 1996. This station kiosk consists of a service entrance, Flygt control system with pump starters and PLC, and a blower fan that provides ventilation to the wet well. The District has been receiving a noticeably high number of alarm calls from this lift station, resulting from equipment malfunctions, power quality, and in general pumps failing to start. This station is fed single phase from an adjacent pole, with an underground dip. No metering appears to be present.

Although this station is not as old as the Kendrick Lift Station, the electrical service and controls have still surpassed its recommended end of life of approximately 20 years. It does not appear that there have been any upgrades to this station since its original install, with the exception of the addition of a Barnett CV3 cellular alarm dialer.

The controller of this station appears to be a proprietary Flygt system, not a third party PLC such as Automation Direct, Schneider, Siemens, etc... Replacements for this controller would only be provided through Flygt, if they are supported and available, which makes user serviceablity minimal.

Although not clear from the photos, it is assumed this lift station is controlled by up to four float switches located in the wet well and tied back to the PLC for pump controls. It is typical that these floats provide a high level alarm, lead pump start signal, lag pump start signal, and a pump stop signal.

Given the age of this station, the alarms are very simplistic as they would normally actuate an alarm beacon on the top of the kiosk. Someone nearby would notice the flashing beacon and notify the District Operators. An alarm dialer appears to have been added and it is possible that the flashing beacon has since been bypassed as alarms will be sent via the dialer.

A receptacle to connect a portable generator is mounted to the side of the kiosk. There does not appear to be a manual transfer switch anywhere inside the kiosk.

RECOMMENDED UPGRADES

The electrical for this lift station is beyond its end of life and has little for communications and/or controls. It is recommended to provide a new kiosk complete with modern controls infrastructure, alarming, back-up generator readiness, modern instrumentation, and back-up system in the event of PLC failure.

The approximate cost for a new electrical kiosk with control system is upwards of $120,000 with a blower fan. This excludes engineering, commissioning, and the provision of a permanent standby generator.

CONCLUSION

Both the Kendrick (Dudley Drive) Lift Station and Adam Street Lift Station are showing signs of age and expiry, and appear to be nearing the end of their operational life. It is recommended to upgrade both lift station kiosks. Both kiosks will be identical in nature except for components related to the pump size. Kiosks can be connected back to a central point via radio, or alarms can be provided via alarm dialer. However, alarms can be made more specific rather than general.

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ELECTRICAL ENGINEERING

PROFESSIONAL ENGINEERING SERVICES REPORT