TDG ENVIRONMENTAL

TRAINING MANUAL:
CCTV Inspections

Contents

TDG Environmental CCTV Inspection Manual

This manual is designed to support both new and existing staff working in and around the CCTV department.

Within this document you'll find essential information to help you navigate the day-to-day operations of the CCTV inspection vehicle, along with valuable guidance on various task involving clients, general maintenance, trouble shooting, dealing with the public, TDG paperwork and health and safety protocols.
Additionally, this manual provides direction for operators to conduct themselves in a way that fosters growth and development within our organization. It will also enhance your understanding of CCTV software and programs, camera set up and maintenance, and general practices for CCTV inspections. Therefore, it is crucial to read and familiarise yourself with this manual and refer to it as necessary.
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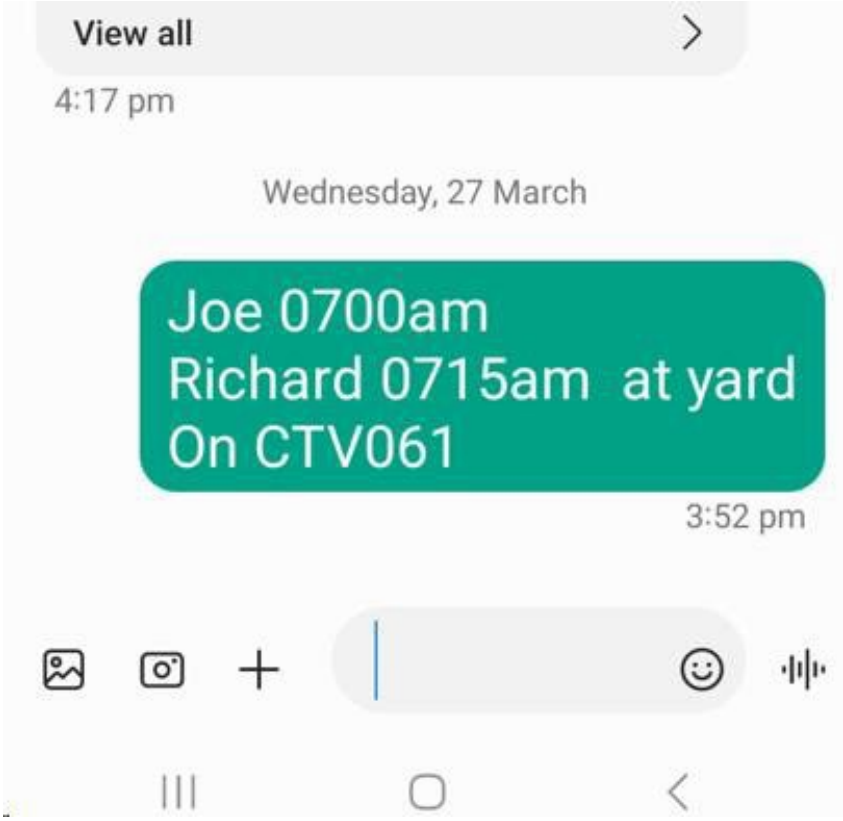
Receiving the daily start text - the evening before

1. A TDG Environmental Supervisor will text you your start time for the following shift by text or email – this is generally done at 5pm the previous day or, earlier in the day if it's for a night shift.
2. If the amount of time needed to get to the site varies – due to traffic delays etc., then it's the operator's duty to advise the client about delays. The client contact details will be listed in your job pack.
3. You are required to familiarise yourself with the equipment that is required to perform your duties the following day e.g. Super-Sonde, Duct-Snake or Pushrod Camera etc.
4. If you have not received a start time text for the next day's shift you are required to call the supervisor to advise them, and they will allocate you to a job.
5. If you finish your job early or are aware the job will not take as long as planned (once arriving at the site), you must give your supervisor plenty of notice so they can allocate you your next job. The earlier you call in to advise the supervisor the easier it is for them to find the vehicle more work.

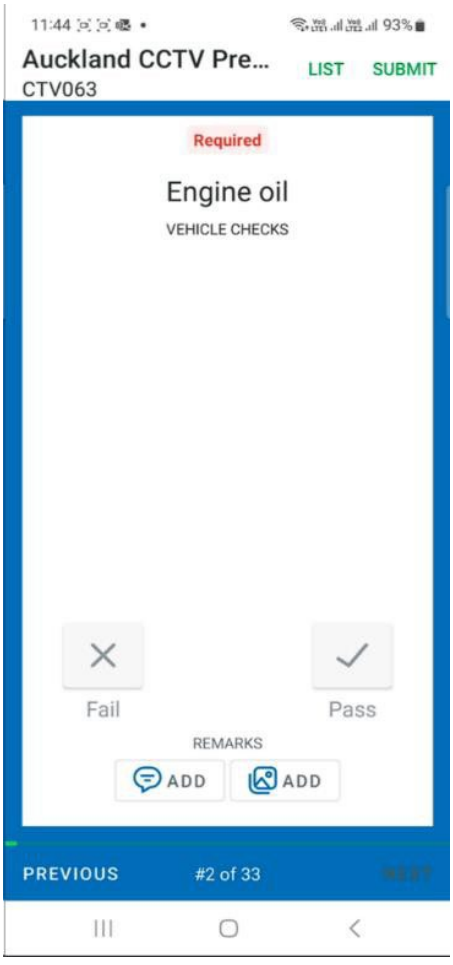


Starting Your Shift at the Depot

1. Arrive at the depot at the time designated by your supervisor.
2. Ensure you are dressed in the appropriate TDG Hi-Vis uniform and PPE upon arriving at work.
3. Verify that you are using the correct vehicle as specified in your daily text or email. If the vehicle seems unusual, confirm with your supervisor upon receiving the daily message.
4. Complete your daily Fleetio inspection and conduct a vehicle walk-around inspection every morning. This is the operator's responsibility.
5. In addition to checking oil, water, fuel, lights, indicators, and gauges, take extra time to inspect the tires and look for any new defects.
6. Clean mirrors before each shift, maintain a clean cab, and ensure the general cleanliness of the vehicle.
7. Ensure you have all the correct equipment for your shift.
8. Note that CCTV vans are equipped for 95% of all allocated work. Occasionally, additional equipment like a Pushrod Camera or Duct Snake may be needed and should be picked up from the yard in the morning.
9. Document and notify your supervisor via text message of any equipment taken from the yard. Return all equipment in the same condition at the end of the shift. Report any damaged equipment to your supervisor immediately and complete an incident report with pictures.
10. When driving a TDG vehicle, represent the company with respect and adhere to all road rules.

Fleetio Inspection and Fuel Bowser Pin Code

1. ***Complete a daily vehicle inspection on your van using the Fleetio App. This is crucial***
2. Your supervisor will provide a Fleetio login and a Fuel pin when you start employment. You must fill out a Fleetio user access and fuel pin confidentiality form.
3. Download the Fleetio app from the Google Play Store or Apple App Store on your mobile device.
4. Perform Fleetio inspections daily on your van before leaving the yard. Thorough inspections are crucial for your safety and to avoid traffic fines.
5. Conduct a weekly inspection of your CCTV equipment.
6. To learn how to complete a Fleetio inspection on your CCTV van, refer to the instructional video available on the training and compliance portal. There is also a video on how to fail an inspection point or report an issue outside of an inspection.
7. Use your fuel pin to fill up your van at the fuel bowser; instructions for using the pin are posted at the bowser. Refuel the van after every shift to ensure it is ready for the next day.

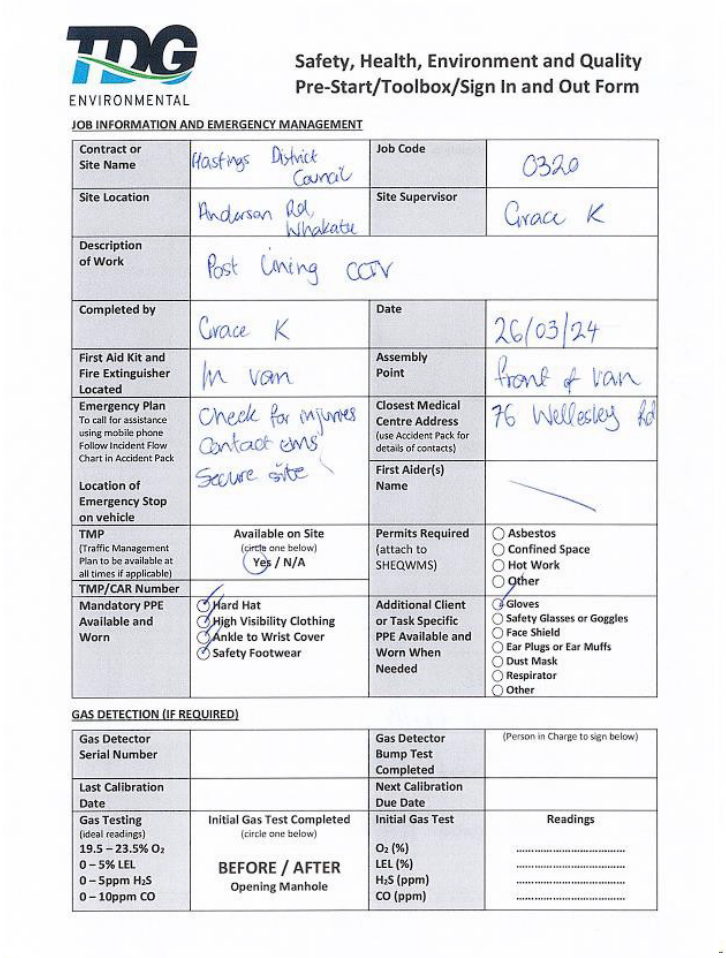


Arriving to site

1. Arrive at the designated start time to set up the camera, contact the client, and prepare the necessary paperwork for the shift.
2. Inform the client of your location or confirm where they want you to begin. Discuss the client's preferred outcome, specific instructions, and site rules.
3. Ensure you understand all aspects of the work or project and communicate outcomes to the client throughout the shift.
4. Complete the Pre-Start form (see image on the next page) and begin the Job Sheet with initial details, such as your arrival time on site.
5. Understand all plans and mark progress throughout the day.
6. Keep supervisors informed about the job's progress throughout the shift. This allows supervisors to schedule additional shifts or new work if the job is completed earlier than expected.
7. Maintain clear communication throughout the shift to help clients understand the progress of the work. This also aids supervisors in their preparations and builds confidence and trust between all parties for long-term relationships.

Filling in the Site-Specific Risk Assessment form

1. Complete a Pre-Start form for every job before beginning work and have it signed off before leaving the site.
2. You will receive a Pre-Start form in your daily job pack and must complete one for each site you visit.
3. Fill in all the required information in the designated spaces.
4. All personnel working in and around the work zone must sign on and off.
5. Any additional personnel (staff and visitors) arriving at the site must be inducted and sign on to the risk assessment. Inform them of key points from the Pre-Start, such as the locations of the first aid kit and fire extinguisher, and the address of the nearest medical center.
6. Complete Risk Assessments in full and have them signed off by the person in charge on the back page. Submit these along with your completed job sheet at the end of your shift.



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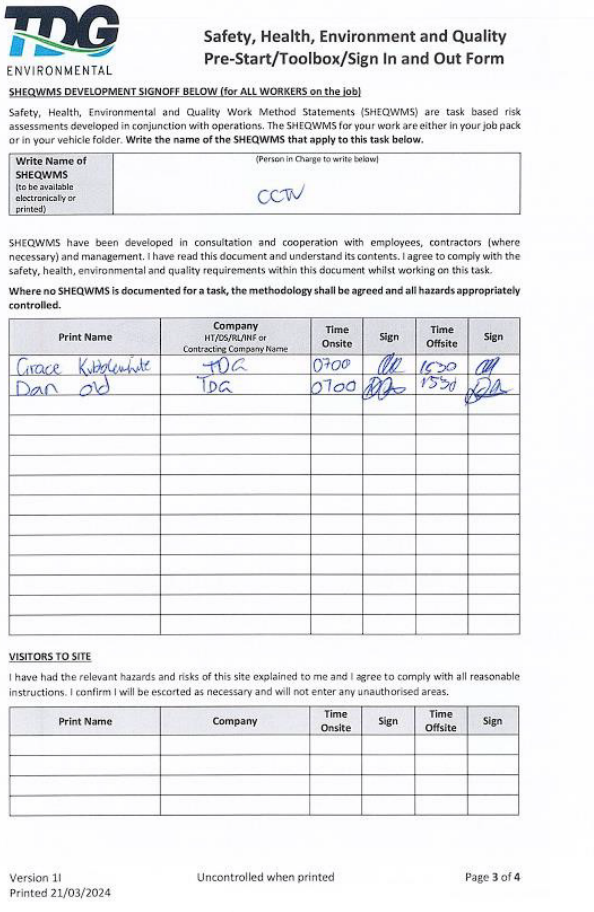
Safety, Health, Environment and Quality
Pre-Start/Toolbox/Sign In and Out Form

JOB INFORMATION AND EMERGENCY MANAGEMENT

Contract or Site Name	Hastings District Council	**Job Code**	0320
Site Location	Anderson Rd, Whakatu	**Site Supervisor**	Grace K
Description of Work	Post Lining CCTV		
Completed by	Grace K	**Date**	26/03/24
First Aid Kit and Fire Extinguisher Located	In van	**Assembly Point**	Front of van
Emergency Plan To call for assistance using mobile phone Follow Incident Flow Chart in Accident Pack **Location of Emergency Stop on vehicle**	Check for injuries Contact ems Secure site	**Closest Medical Centre Address** (use Accident Pack for details of contacts) **First Aider(s) Name**	76 Wellesley Rd
TMP (Traffic Management Plan to be available at all times if applicable) **TMP/CAR Number**	**Available on Site** (circle one below) Yes / N/A	**Permits Required** (attach to SHEQWMS)	○ Asbestos ○ Confined Space ○ Hot Work ○ Other
Mandatory PPE Available and Worn	✓ Hard Hat ✓ High Visibility Clothing ✓ Ankle to Wrist Cover ✓ Safety Footwear	**Additional Client or Task Specific PPE Available and Worn When Needed**	✓ Gloves ○ Safety Glasses or Goggles ○ Face Shield ○ Ear Plugs or Ear Muffs ○ Dust Mask ○ Respirator ○ Other

GAS DETECTION (IF REQUIRED)

Gas Detector Serial Number		**Gas Detector Bump Test Completed**	(Person in Charge to sign below)
Last Calibration Date		**Next Calibration Due Date**	
Gas Testing (ideal readings) 19.5 – 23.5% O_2 0 – 5% LEL 0 – 5ppm H_2S 0 – 10ppm CO	**Initial Gas Test Completed** (circle one below) **BEFORE / AFTER** Opening Manhole	**Initial Gas Test** O_2 (%) LEL (%) H_2S (ppm) CO (ppm)	**Readings** ....



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Safety, Health, Environment and Quality
Pre-Start/Toolbox/Sign In and Out Form

SHEQWMS DEVELOPMENT SIGNOFF BELOW (for ALL WORKERS on the job)

Safety, Health, Environmental and Quality Work Method Statements (SHEQWMS) are task based risk assessments developed in conjunction with operations. The SHEQWMS for your work are either in your job pack or in your vehicle folder. **Write the name of the SHEQWMS that apply to this task below.**

Write Name of SHEQWMS (to be available electronically or printed)	(Person in Charge to write below) CCTV

SHEQWMS have been developed in consultation and cooperation with employees, contractors (where necessary) and management. I have read this document and understand its contents. I agree to comply with the safety, health, environmental and quality requirements within this document whilst working on this task.

Where no SHEQWMS is documented for a task, the methodology shall be agreed and all hazards appropriately controlled.

Print Name	Company HT/DS/RL/INF or Contracting Company Name	Time Onsite	Sign	Time Offsite	Sign
Grace Kuttelwhite	TDG	0700		1530	
Dan Old	TDG	0700		1550	

VISITORS TO SITE

I have had the relevant hazards and risks of this site explained to me and I agree to comply with all reasonable instructions. I confirm I will be escorted as necessary and will not enter any unauthorised areas.

Print Name	Company	Time Onsite	Sign	Time Offsite	Sign

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Safe Work Method Statements (SHEQWMS)

1. Your SHEQWMS provide general guidance on the activities you undertake.
2. In your vehicle there are Safe Work Method Statements specific to the task you undertake – this is available in the health and safety folder located in your van.
3. Your Fleetio inspection requires you to sign off that there is a health and safety folder available to you in your van which contains the SHEQWMS.
4. SHEQWMS provides guidelines for completing tasks safely and identifying required components.
5. Follow your job steps outlined in SHEQWMS and ensure controls are implemented for any hazards identified.

HYDROTECH GROUP

Safety, Health, Environment and Quality Work Method Statement
CCTV

Scope of works: Deployment and retrieval of CCTV camera via manhole into Stormwater or sewer mains

Training Required to carry out activity	Plant and Equipment	Plant & Equipment maintenance checks required	Documents to be completed/available
✓ General company Induction ✓ Site Induction ✓ CCTV Competency assessment ✓ SHEQ Modules ✓ CSE certificate ✓ Class 1 Drivers licence **Training records are located in the site vehicle or office.**	✓ CCTV push camera ✓ CCTV Van ✓ Petrol generator ✓ CCTV tractor Unit ✓ Gas Detector	✓ Vehicle daily check ✓ PPE Check ✓ Camera and generator check ✓ Tractor Unit ✓ Gas Detector check prior to leaving yard	✓ Pre-start meeting ✓ Emergency and medical plan refer Pre-start form ✓ Job Pack ✓ Timesheets ✓ Accident pack ✓ SDS **Documents are located in the site vehicle SHEQ Folder**

PPE Required for this activity:	SDS Required	Permits/Approvals required for this activity
 Hard Hat, Gloves, Hi-Viz, Steelcap boots, Long-longs	✓ 91 petrol ✓ Easy Tutti Frutti Disinfectant ✓ CRC lubricant ✓ Dazzle ✓ Help it hand Sanitiser ✓ Hand cleaner	✓ CSE permit to work

Steps of task and associated risks

Planning job

Hazards (what can cause harm/damage?)	Risk (illness/injury/environmental or reputational damage)	Initial Risk Rating	Controls (Eliminate, Minimise)	Final Risk Rating

Incident reporting

It is mandatory that all incidents, injuries, near misses and crisis management events are reported promptly to your supervisor/manager – these are to be done by the end of your shift and same day as the occurrence.

Incidents can be events involving equipment malfunctions, safety violations, environmental damage, property damage, and personnel incidents.

Injuries range from physical injuries like cuts, bruises, and fractures to chemical exposure, respiratory issues, and trauma.

A near miss refers to a situation where there was no damage to property or personal injury, but where a slight change in time or position could have resulted in damage or injury. Near misses are also known as close calls, near accidents, or injury-free events.

TDG Environmental has a QR code which allows you to report incidents via the incident reporting portal, there is also a paper incident report form, which you can use.

Incident reporting cont.

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Incident Report Form

Incident, Accident, Hazard or Near Hit Reporting

Injury	◉	**Illness**	○	**Incident or Feedback**	○	**Near Hit**	○
Person Reporting	Karla	**Person(s) Involved**	Michael	**Vehicle Registration**	FWN199	**Plant Code**	CTV056
Contract Number	8246	**Client Name**	Watercare	**Site Supervisor**	Tom	**Location of Incident**	Titirangi Road
Incident Date	03.05.24	**Incident Time**	13:30pm	**Person(s) Started Work**	0800am	**Vault ID Reference**	
Description of incident: Be detailed, including area, road name, direction, vehicle, those involved	CCTV Tractor dropped in Manhole while on site on March Cato job - footage lost			**Immediate action taken:** What did you do? Who did you call? Did you need to secure the scene?	Troubleshoot with supervisor on phone, was able to retrieve camera, close manhole lid, and turn off system.		
Why did it happen? What caused the incident; Can you explain how it happened?	Lowering tractor down too quickly.			**What could be done to prevent it happening again?** Behaviour, training, equipment, repair.	Need to take care with gear, follow proper technique and slow down.		

Use the Risk Assessment Matrix on the back page to rate this incident and its potential below

ACTUAL Probability (how often does this occur?)	**POTENTIAL Probability** (what is the chance of this happening again?)	**ACTUAL Consequence** (what actually happened?)	**POTENTIAL Consequence** (what could have happened?)
○ Rare	○ Rare	○ Negligible	○ Negligible
○ Unlikely	◉ Unlikely	◉ Minor	○ Minor
◉ Occasional	○ Occasional	○ Major	○ Major
○ Likely	○ Likely	○ Critical	◉ Critical
○ Certain	○ Certain	○ Catastrophic	○ Catastrophic

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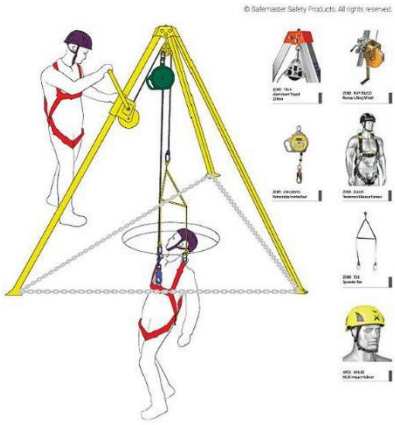
Confined Space Entry (if required)

1. Ensure all personnel are trained and certified.
2. Make sure your Gas Detector/Tripod/Harness/Winch are calibrated and within testing date, and in safe working order before leaving yard or commencing work.



3. Along with the Pre-Start form, a confined space permit must be filled in before starting work. This will be given to you in your job pack.
4. The client must be aware that a confined space entry is being carried out, some Clients have their own permit that must also be completed.
5. Expose manhole lid per your SHEQWMS – do not open until gas detection completed.
6. Take confined space gear over to the chamber or manhole.
7. Set up the tripod over chamber/manhole by extending the legs to the appropriate length and height.
8. Turn the gas detector on and allow it to go through its functions in clean air. (if using a generator swing gas detector downwind)
9. Sweep gas detector over the manhole lid several times to monitor levels – DO NOT OPEN LID IF GAS ALARM SOUNDS.
10. Open chamber/manhole slightly to do gas test around rim. After 30 seconds to one-minute lower gas detector to entry of chamber and take reading, if within limits take reading at midpoint down chamber and again at lower part of chamber and perform another test for 30 seconds to one minute.

11. Fill out appropriate information from Gas Detector onto Confined Space Permit.
12. Set up Reel/Rope, attach to Tripod, put on Harness/Gas Detector. Ensure appropriate PPE is also worn.
13. Person in Charge (PIC) - PIC ensures entrant is fit to enter and a dedicated winch person lowers the entrant. PIC must always remain over the opening with eyes on the Entrant and in voice contact. No CSE entry can be undertaken with only one surface support person.
14. When works are finished and worker is out of manhole, fill out confined space permit to confirm that all staff have left the confined space.

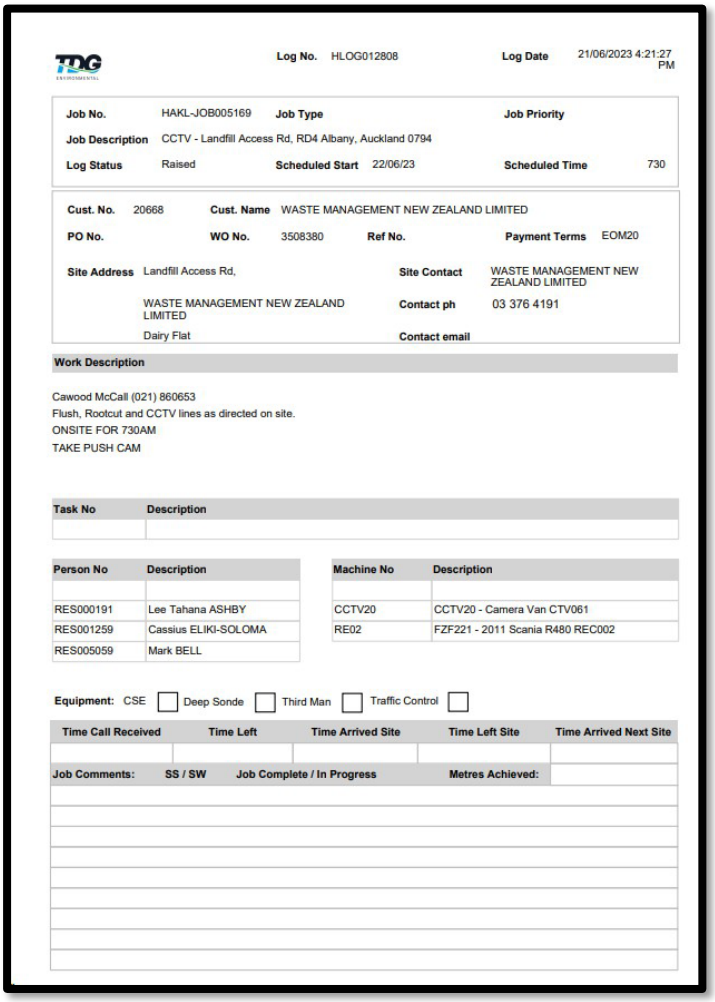
Never enter a confined space unless you are trained to do so and have completed a confined space entry permit with sufficient trained workers on site to assist.

Parking CCTV vehicle in the work area

1. Park in the location specified by your Traffic Management Plan when on a public road.
2. Always use a spotter when reversing any vehicle, regardless of conditions. Ensure the radio is turned down and the windows are open so you can hear any emergency calls.
3. Set up your work zone using appropriate signage and road cones.
4. Use cone barriers to barricade any manholes or grates before opening them within the work area.
5. Ensure pedestrians have accessible paths around the work zone.
6. After completing work, close or replace all grates and manhole covers before packing up signage and cones into the van.

Daily job sheet

1. You will receive a job sheet in your job pack for each job assigned to you.
2. Your job sheet will include the scope of work, client details, equipment required, and any notes from the supervisor about the job.
3. It is good practice to fill out the job sheet and other relevant paperwork during inspections or downtime while waiting for the client.
4. It is crucial to fill out the job sheet with all the requested information in neat and tidy writing, as the TDG accounts team relies on it for invoicing.
5. The job sheet is essential for linking the work performed to invoicing and payment. Ensure it is completed accurately and includes all vital information. Provide as much detail as possible about the job and on-site activities.



Log No. HLOG012808 Log Date 21/06/2023 4:21:27 PM

Job No.	HAKL-JOB005169	Job Type		Job Priority	
Job Description	CCTV - Landfill Access Rd, RD4 Albany, Auckland 0794				
Log Status	Raised	Scheduled Start	22/06/23	Scheduled Time	730

Cust. No.	20668	Cust. Name	WASTE MANAGEMENT NEW ZEALAND LIMITED		
PO No.		WO No.	3508380	Ref No.	Payment Terms EOM20
Site Address	Landfill Access Rd, WASTE MANAGEMENT NEW ZEALAND LIMITED Dairy Flat	Site Contact	WASTE MANAGEMENT NEW ZEALAND LIMITED		
		Contact ph	03 376 4191		
		Contact email			

Work Description

Cawood McCall (021) 860653
Flush, Rootcut and CCTV lines as directed on site.
ONSITE FOR 730AM
TAKE PUSH CAM

Task No	Description

Person No	Description
RES000191	Lee Tahana ASHBY
RES001259	Cassius ELIKI-SOLOMA
RES005059	Mark BELL

Machine No	Description
CCTV20	CCTV20 - Camera Van CTV061
RE02	FZF221 - 2011 Scania R480 REC002

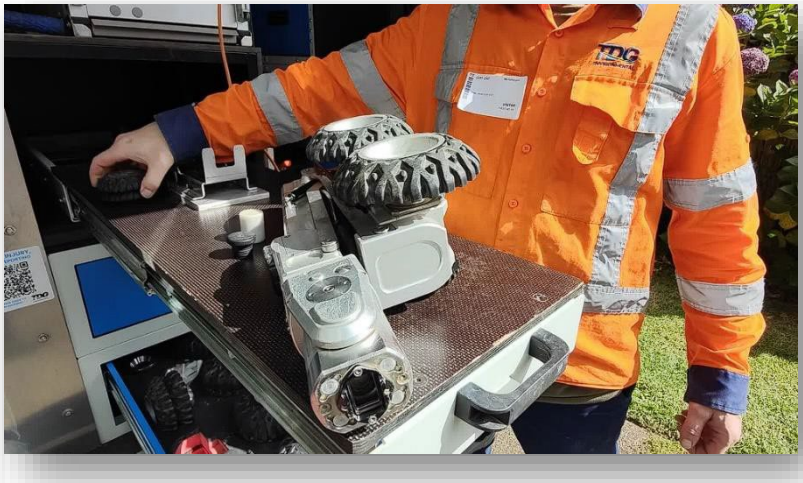
Equipment: CSE ☐ Deep Sonde ☐ Third Man ☐ Traffic Control ☐

Time Call Received	Time Left	Time Arrived Site	Time Left Site	Time Arrived Next Site

Job Comments: SS / SW Job Complete / In Progress Metres Achieved:

Before Leaving Site

a) If you expect your job will not take all day and you do not have a second job planned, contact your supervisor as early as possible so your next job can be organized.
b) Ensure the client has been updated with what work has been completed and what is outstanding.
c) Check all tools and equipment have been returned to the van in the correct place.
d) All covers and grates must be closed.
e) The van is in a tidy condition and any rubbish is in the bin.
f) Camera equipment has caps and protective plugs replaced.
g) The crawler must be stowed correctly to prevent damage and should not be able to roll freely, use a strap or secure the camera so it is unable to move.
h) Ensure any extra work that is undertaken has been signed off a site foreman or engineer (on job sheet).
i) Have a conversation with the site foreman or engineer to understand whether there is any upcoming work with the client or on the site.
j) Before leaving site confirm footage has been saved to Wincam.



Fuel

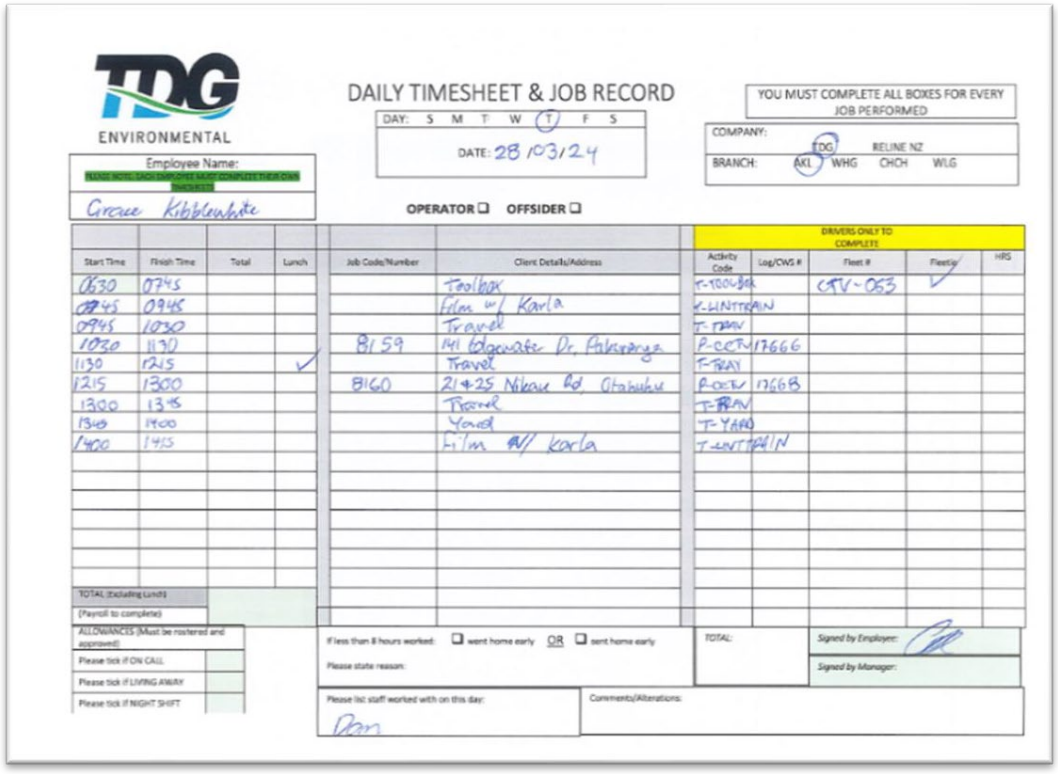
It is good practice to refuel the vehicles when returning to the yard. This ensures the vehicle has sufficient fuel for the next day and prevents delays in arriving at the site. Fill up at the fuel bowser in your yard by entering your PIN code (provided by your supervisor), the fleet number (not the registration number), and the hubbo reading. For vehicles without a hubbo, use the odometer reading.

End of Day

1. Fill the water tank ready for the next day if it is low or empty.
2. CCTV vans should be washed weekly or after jobs that have been exposed to excessive dirt/debris.
3. All rubbish must be removed from the van.
4. Ensure the inverter is off and laptop lid closed. In some cases when files are still uploading it may be appropriate to leave the invertor on, but monitors must be switched off.
5. Vans must be plugged into the power outlet.
6. Paperwork that has been completed onsite needs to be compiled together or in a plastic sleeve and placed in the correct pigeonhole/tray for the office, remember:
    a. Pre-Start form
    b. USBs
7. If arriving back to the yard early, check with your supervisor if there are any other tasks to assist with before heading home.
8. It is not necessary to linger around the yard at the end of the day unless completing the points noted above.

Timesheets

1. Timesheets should be filled in daily.
2. Timesheets must be given or emailed to your supervisor by 0800am Monday morning, failure to do so may result in incorrect pay.
3. Photos of timesheets must be clear and complete, poor photos will be rejected.
4. When completing your timesheet, be sure to include your full name, job number and accurate information.
5. Be sure to write legibly, ensuring that your handwriting is clear and easy to read.
6. Timesheets that are inaccurate or illegible will be rejected.



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DAILY TIMESHEET & JOB RECORD

DAY: S M T W T F S

DATE: 28/03/24

YOU MUST COMPLETE ALL BOXES FOR EVERY JOB PERFORMED

COMPANY: TDG RELINE NZ

BRANCH: AKL WHG CHCH WLG

Employee Name: Grace Kibblewhite

OPERATOR ☐ OFFSIDER ☐

Start Time	Finish Time	Total	Lunch	Job Code/Number	Client Details/Address	DRIVERS ONLY TO COMPLETE: Activity Code	Log/CWS #	Fleet #	Fleet Ok	HRS
0630	0745				Toolbox	T-TOOLBOX		CCTV-063	✓	
0745	0945				Film w/ Karla	V-LINTRAIN				
0945	1030				Travel	T-TRAV				
1030	1130			8159	141 Edgewater Dr, Pakuranga	P-CCTV	17666			
1130	1215		✓		Travel	T-TRAV				
1215	1300			8160	21+25 Nikau Rd, Otahuhu	P-CCTV	17668			
1300	1345				Travel	T-TRAV				
1345	1400				Travel	T-YARD				
1400	1415				Film w/ karla	T-LINTRAIN				

TOTAL (Excluding Lunch)

(Payroll to complete)

ALLOWANCES (Must be rostered and approved)

Please tick if ON CALL

Please tick if LIVING AWAY

Please tick if NIGHT SHIFT

If less than 8 hours worked: ☐ went home early OR ☐ sent home early

Please state reason:

TOTAL:

Signed by Employee:

Signed by Manager:

Please list staff worked with on this day: Dan

Comments/Alterations:

CCTV Maintenance

1. A thorough clean of the equipment is required to be done weekly (or as required if necessary)
2. Wind cable off drum and clean with a wet rag while retracting the cable, also check for kinks and tears on the cable. If they find a nick or tear inform CCTV Service Center/technician
3. Check the reels meter counter wheel is clean, free of dirt and calibrated.
4. Check all connectors are clean and pins are intact.
5. Check spare parts (bolts, O-rings, lubricant, wheels)
6. Remove and clean all hubs with water.
7. Wash and scrub crawler/robot with brush.
8. Lube all exposed O-rings.
9. Email photos to your supervisor.

Camera setup

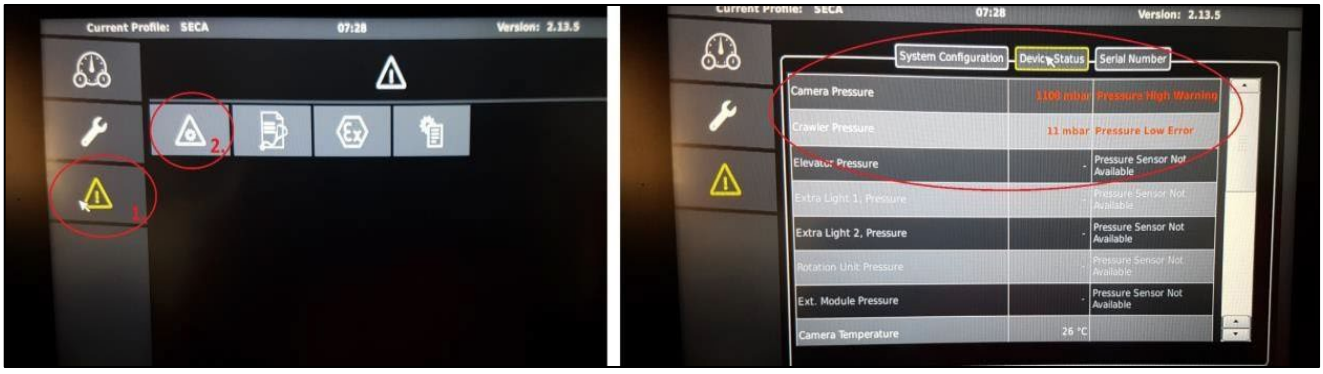
1. Set up crawler to the correct size for the
2. diameter of conduit.
3. Always check for any loose wheels and hubs. Use the black hub tool in a circular motion to remove the hub cap, then the star key or allen key to tighten the hub to the crawler.
4. Pull out enough cable to get to the base of the manhole/chamber and then connect it to the crawler
5. Turn the camera on and wait for the system to boot up.
6. Check camera lights, air pressure and functions, especially when surveying deep manholes or on difficult setups
7. Camera head pan/tilt
8. Camera head zoom and focus in/out (depending on system)
9. Scissor lift movement top to bottom (depending on system)
10. Drive forward & back
11. Turn left & right
12. Clear picture with clean camera lens

Air Pressure:

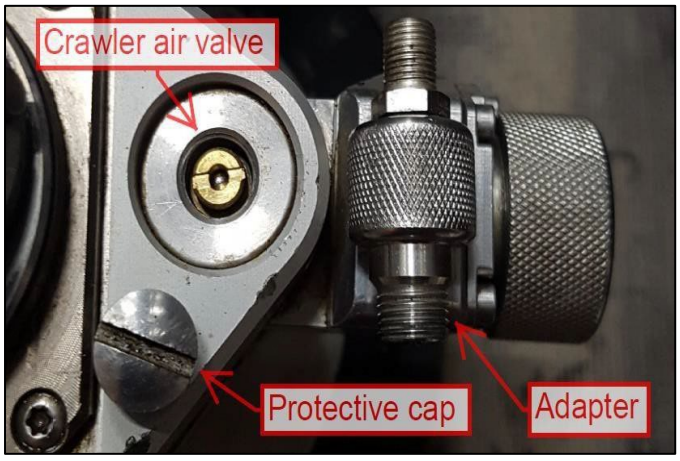
Check air pressure on the camera system, each component on the crawler must be checked and replenished if necessary.

Rovion system (Camera head, crawler, scissor lift, top light extension light):

1. Press the triangle on the left of the display
2. Press the triangle in the menu screen
3. Press “Device Status”, review pressure status for each component



To replenish the air, remove the protective cap, then insert the adapter and fill it with nitrogen, alternatively use a bike pump if stuck onsite or do not have access. Note only a very small amount is required, avoid over pressurizing. 10PSI is the maximum pressure required.



Lowering Gear into Manhole:

1. Bring camera over to manhole, then open the manhole according to procedure outlined in SHEQWMS. Ensure you have enough loose cable and rope for the depth of the manhole.
2. Attach lowering hook to camera ensuring that the open end is facing the rear of the camera (ready for step e)
3. Place feet in a stable and comfortable position to open manhole.
4. Hold the rope and cable together and slowly lower camera into manhole with a hand over hand technique, never slide the rope/cable through your hands.
5. Gently lower hook to the rear of the tractor to unlatch to release the hook.
6. Using the remote, position your camera into the survey start position (center of manhole)
7. Crawler is not to be pushed into the pipe with the clutch engaged, use the remote or lift into position.
8. Adjust and place camera and sleeve into appropriate position, double check the cable is protected against the pipe and manhole edges (especially PVC pipes)

Camera Remote:

Option A:
- Green = Camera head movement
- Yellow = Head raiser

Option B:
- Green = crawler drive
- Yellow = cable in/out

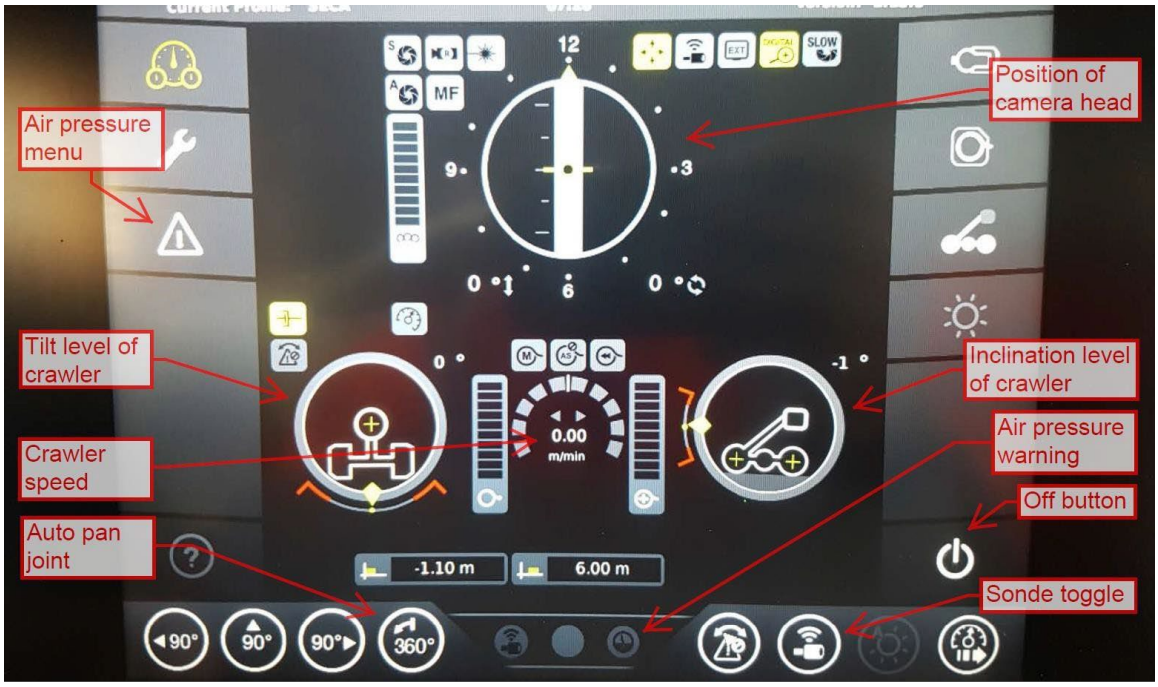
Speed Options:
- 50%
- 100%
- 150% (both lights)

WARNING: always ensure the remote is not set to 150%, this option will reverse the crawler when retracting the cable. This has potential to unexpectedly reverse the camera off an edge and cause imminent damage.

Rovion Display:

In the picture below are the main features of the Rovion display

- Device Status menu – to check air levels
- Tilt level of crawler – will warn when reaching tilt limits
- Crawler speed – must be followed as per the WSA
- Auto pan joint – when stopped, will pan up and around a joint
- Position of camera head – useful when inputting observations
- Inclination level of crawler – should reflect the conduit flow
- Air pressure warning – will flash red when air is low
- Off button – recommended over the emergency stop
- Sonde toggle – always remember to turn on before locating



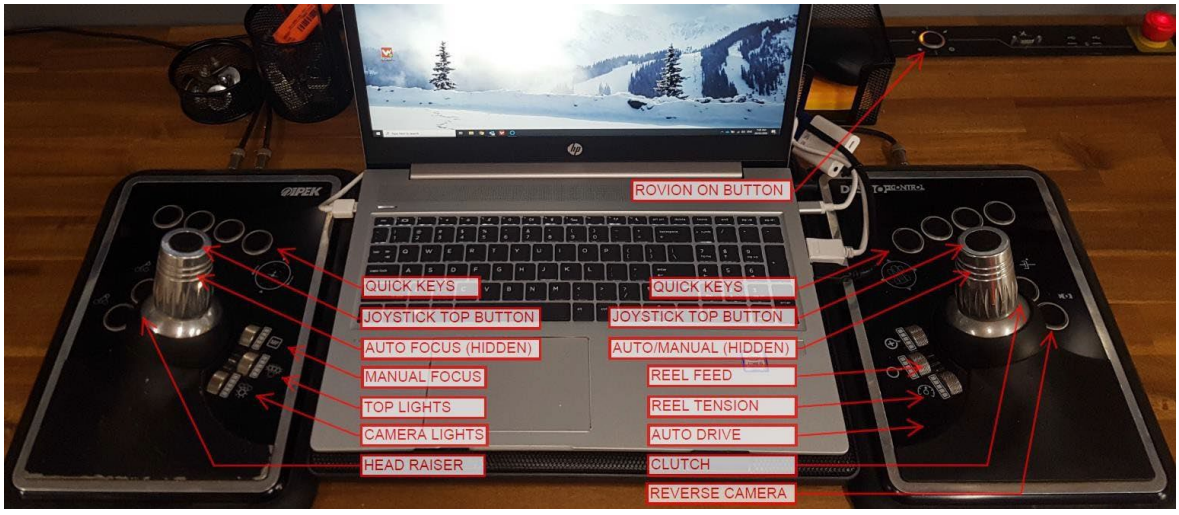
Rovion Controllers:

Left controller:

- Quick keys – reflects the bottom left options on the display screen
- Joystick movement– to control camera head pan and tilt
- Joystick twist – will zoom the camera head picture in/out
- Joystick top button – centers the camera head to its home position
- Auto focus button – clears any manual focus adjustments
- Manual focus wheel – to focusing on specific objects often in the distance
- Top light wheel – adjusts brightness of top lights & extension lights
- Camera head light wheel – adjusts brightness of camera lights
- Head raiser buttons – lifts head raiser up/down to center head in the pipe

Right controller:

- Quick keys – reflects the bottom right options on the display screen
- Joystick movement– to control crawler drive and turn options
- Joystick twist – will turn the crawler left/right on the spot
- Joystick top button – cancels any manual reel and drive settings
- Reel feed wheel – controls speed of the reel when set to manual
- Reel auto/manual button – controls the reel when moving forward/back
- Reel tension wheel – shows the tension level (two lights on is best)
- Auto drive wheel – typically not used, joystick movement is best
- Clutch – toggles clutch for drive on and off
- Reverse camera – toggles the front and rear camera picture



Driving in the pipe: -

Driving forward down the pipe:

1. Have the camera head in the center of the pipe (or close as possible)
2. Ensure tiger tail (protective sleeve) is halfway through the pipe interface
3. Avoid excessive attempts at getting over debris/displacements, no more than 1-2 attempts should be taken to get over something.
4. Set the reel auto/manual button to auto, this will allow cable to unwind as the crawler drives forward. Ideally the tension wheel should display two lights and can be adjusted while driving.
5. Take great care if you need to reverse in auto as the reel will rip the cable back with excessive torque
6. Engage manual if you need to reverse

Driving backward out of the pipe:

1. Engage the reversing camera.
2. Adjust the tension wheel to maintain a small amount of slack on the cable while reversing to avoid excessive tension on the cable/crawler.
3. Monitor the camera position and distance while reversing to ensure it does not tip and can be placed in manual mode before reaching the manhole.
4. Do not reverse over the cable, stop, wind the slack up before continuing
5. Ensure the elevator is in the lowest position to avoid tipping the camera.
6. Switch the reel to manual before reaching the manhole to avoid the reel lifting the rear of the crawler upwards while driving backwards.

Getting stuck & Tipping the Camera

Getting Stuck:

As soon as you believe the camera is stuck, call your supervisor immediately before attempting any rescue – your supervisor may help you work through the following steps.

1. Look around, lift your head raiser to view your wheels, debris, and surroundings.
2. Understand what you are stuck on and the best way to free the crawler/robot.
3. Avoid using the reel to pull the crawler/robot backwards with excessive tension.
4. Disengage the clutch and pull the cable from inside the manhole.
5. Consider a CSE depending on staff, location, diameter, flow.

Tipping the camera:

As soon as you believe the camera is stuck, call your supervisor immediately before attempting any rescue – your supervisor may help you work through the following steps.

1. Look around lift your head raiser/cutter to view your wheels, debris, and surroundings.
2. Consider how far from the manholes you are, are there buried manholes, diameter of the pipe.
3. Can you upright the camera within the pipe, this is easier in pipes <600mm.
4. The use of the head raiser and driving motion can get the camera upright.
5. Can you drive the camera back or forward to the nearest manhole on its side?
6. This is often better for the equipment than dragging.
7. Call your supervisor for assistance.
8. Consider a CSE depending on staff, location, diameter, flow.

Surveying:

TDG Environmental use Wincam. This program is used to report codes that identify defects & features in the pipeline using the coding standard New Zealand Pipe Inspection Manual – 4th edition. All TDG CCTV operators must understand and work to this standard for all inspections, along with any specific requirements the client requests.

Conduit Data:

Wincam requires some information about the pipe prior to being surveyed, some key data is:

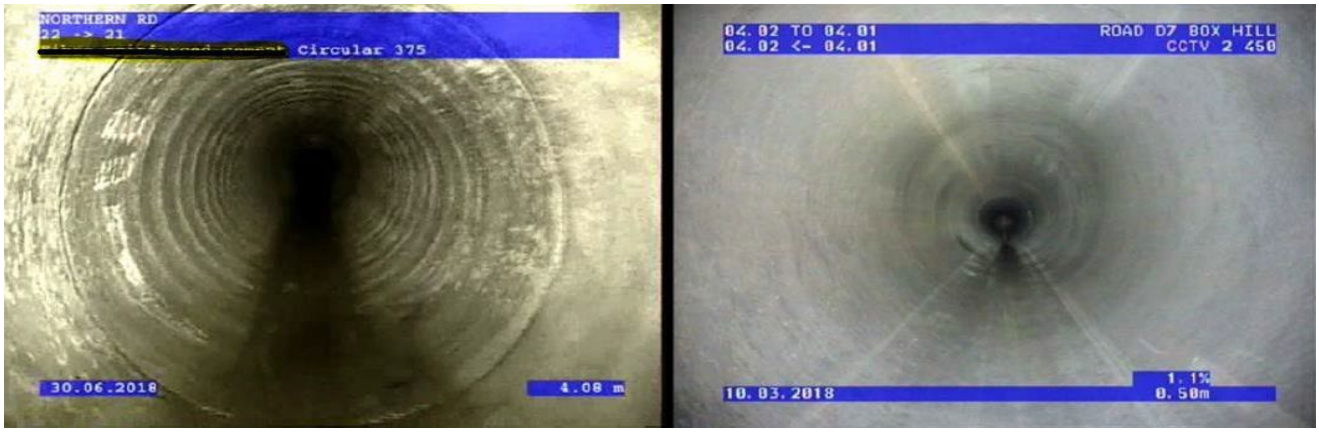
1. Pipe asset ID
2. Name of contractor and client
3. Upstream/downstream manhole IDs
4. Setup
5. Weather
6. Inspection date/time
7. Site address
8. Use of pipe
9. Purpose of inspection
10. Cleaning status
11. Diameter
12. Manhole depth (when able)

It is the operator's responsibility to ensure the correct information is used for the survey, it is advised to double check this data prior to surveying.

1. In some instances, we may need to create our own temporary IDs if new assets are found that are not shown on the council GIS or are private assets.
2. Diameters must be physically measured, do not rely on plans. If the diameter is unable to be confirmed, a remark should be added to the start observation.
3. Material must be correct; it is a common mistake to mix up different types of concrete for example. The material can be determined by the joint spacing.
4. determined by the joint spacing.

Conduit Data Cont.:

Reinforced Concrete (left): has ripples in the concrete from the way it was made, and the joints are not as flat together. Reinforced Concrete also typically has lifting lugs



AC Cement (right): This material has fibers mixed with cement in layers and therefore should be easy to pick up on. Joint spacing is the easiest way to determine pipe material.

HDPE (left and right): This material is a flexible plastic pipe – mainly used to replace aging concrete or steel pipelines. It will be jet black.