

STANDARD OPERATING PROCEDURE

General Survey		Document Number: 962C-SOP-039
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GENERAL SURVEY

6	APP	Nov 25, 2024	Approved	D. Cunningham	L. Norris	T. Siver
5	APP	June 21, 2022	Approved	L. Norris	L. Norris	T. Siver
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Rev	Status	Rev. Date	Status Description	Prepared by	Reviewed by	Approved by



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The following is a step-by-step procedure on how to complete a specific task or meet a facility specific requirement. Standard Operating Procedures (SOPs) are written for all identified critical tasks. By virtue of the hazard or complexity associated with critical tasks it is paramount that the SOP be followed as written. SOPs contain a listing of high-level hazards associated with the task, for detailed hazard analysis reference the applicable Task Hazard Assessments. SOPs do not replace the requirements contained in the company Standards, Codes, and Processes nor does it replace the need to comply with required legislation. Section 8.0 references documentation that the worker shall understand before work commences.

1.0 PURPOSE

- To establish a company standard to safely and effectively carry out work as it applies to general surveying.

2.0 SCOPE AND APPLICATION

- This document applies to all company operations. Ensure all site specific requirements are being met or exceeded before performing the task.

3.0 HAZARDS AND CONTROLS

- Insufficient information prior to starting work (unfamiliar with work areas, location of muster areas and emergency meeting points).
 - Refer to Section 4 Checklist for additional requirements prior to start of work.
 - Confirm location of muster points and Emergency Meeting Points prior to start of work (map review or tour of work area). Meeting point to be identified at morning PSI.
 - Supervisor to explain tasks prior to start of work.
 - Review Safe Work Permit, if applicable to work scope.
 - Follow the company's Life Saving Rules and Client Site Rules.
- Poor lighting and/or visibility in work areas.
 - Monitor lighting requirements.
 - Use of light plants.
 - Use of headlamp.
- Mine and site driving – Unauthorized driving on the mine or site.
 - Personnel to have valid site specific mine/site driving pass/certificate.
 - Vehicles to have valid vehicle pass.
 - Travel predetermined traffic routes.
 - Drive only to / or in authorized work areas.
- Mine traffic and interaction with heavy equipment.
 - Do not travel in unauthorized work areas.
 - Radio communication – Used assigned radio channel.

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- Review / follow site driving rules (i.e. Highway Rules, Blindside Rules).
- Follow safe approach procedure as identified in 962C-SOP-042 Approaching Equipment.
- Light vehicle traffic.
 - Beacon lights, buggy whip, vehicle lights are in clean and in good operating order.
 - Ensure vehicle windows & mirrors are clean.
 - Ensure vehicle logos are clearly visible.
 - Ensure pre-use inspection check list has been filled out.
- Site road conditions.
 - Obey all signs & posted maximum speed limits.
 - Drive slower where required.
 - Avoid areas with pooled water (depth unknown).
 - Avoid large ruts.
- Other workers in the area.
 - Assess work or other activities in area prior to entering area.
 - Notify other workers or area supervisor prior to entering work area.
 - Sign on to FLRA / or other applicable documents for other workers to assess and understand hazards and mitigating controls that are being used.
- Poor ground conditions and rugged terrain contributing to personal injury (rolled ankles, slips, trips).
 - Ensure hazard assessment of work area is completed prior to the start of task.
 - Take microbreaks as needed.
 - Footwear suited for task and ground conditions. Must have sufficient ankle support and tread.
 - Footwear requirements may change as a result of seasonal requirements.
 - Traction aids where needed (Identify on FLRA when conditions require removal of auxiliary traction aids).
 - Follow footwear requirements as identified in 950C-C-048 – PPE Footwear Protection Code.
 - Watch foot placement and avoid walking on rocks or depressions.
 - Ensure use of all appropriate PPE.
 - Use of three point contact when entering and exiting vehicles.
- Working around heavy equipment
 - Surveyors to have positive communication with operators prior to approaching equipment (50 meters). All implements must be lowered and operator out of cab within (10 meters). Follow 962C-SOP-042 Approaching Equipment.
 - Do not approach or work around equipment in blind spots. Personnel to approach equipment from the front and cab side (good side) of heavy equipment or haul truck.

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- Use of frost pins and surveying stakes (flying debris – metal splinters, contact with hammer, pinch point between hammer & pin, wood splinters, weight of stake bag).
 - Ensure use of proper eye protection.
 - Ensure proper hand protection is selected for protection against splinters.
 - Alternate shoulders when carrying stake bag.
 - Inspect frost pins and hammers prior to use, Remove burrs from pins and hammers if present (re-dress), remove hammer from service if handle is damaged.
 - Personnel not involved with hammering of frost pins to stand clear of immediate work area so as not to get hit with metal splinters.
 - Ensure proper hand placement to avoid contact with hammer.
 - Frost pins to be equipped with non-metal caps.

- Exposure to elements (frost bite, frost nip, heat stroke etc.)
 - Ensure that proper clothing is worn and skin is covered up during the winter.
 - Use buddy system and watch for yellow or white patches on co-workers skin.
 - Keep hydrated: warm drinks in the winter and cool drinks in the summer.
 - Take adequate warm up / cool down breaks.

- Working near high wall face with light vehicle or on foot (poor ground conditions, high wall face failure due to sliding or toppling caused by equipment working overhead, and substandard soil mechanics due to vibration, weather and surface encumbrances i.e. excessive loading).
 - Use 4-wheel drive when required.
 - Walk areas unsuitable for light vehicles.
 - Never drive parallel to the face when within twice the height of the face limit.
 - When collecting survey information on the face use reflector-less scan technology or a Remotely Piloted Aircraft System (RPAS) to avoid walking within twice the height of the face limit (for the toe) or one times the height of the face limit (for the crest).
 - Visually inspect the face at a minimum distance of twice the height of the face. Communicate and confirm with pit supervisor the stability of the face during the shift. Signs of potential imminent failure as per the following:
 - Face ravelling (trickles of sand or large particles coming off the face)
 - Water running down the face
 - Any face movement
 - Exposed joint planes
 - Indicative rubble piles
 - Overhangs of material at the top of the face

 - If any of the above conditions exist, or if the face appears at all to be unstable, do not enter into the area. Maintain a minimum distance from the face equal to twice the height of the face (toe) or one times the height (crest).

 - Do not work in an area where there is equipment working overhead (i.e. dozer ripping and pushing material over the top of the face).

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- If working on the crest of a face, maintain a minimum distance of one times the height away from the edge. Ensure the edge is bermed to prevent a fall hazard or maintain a distance of 4 metres or greater from the edge.
- For high risk jobs that require the surveyor to physically encroach on the toe of the face within minimum distance (twice the height of the face), Survey shall:
 - Inspect the face for fractures.
 - Confirm stability of face prior to job with pit supervisor.
 - Plan the job to limit the amount of exposure time to the face.
 - Park at a minimum of 10 meters or one face height away (whichever distance is greater) from the centre of the face (not the toe) with the vehicle perpendicular to the face.
 - Ensure the light vehicle is positioned between the surveyor and face.
 - Continually monitor the face and/or use a spotter, in constant communication with surveyor on the ground to monitor the face.
- Use of Remotely Piloted Aircraft System (RPAS) to pick up survey limits. Potential for unauthorized flying and contact with objects or equipment.
 - Do not fly within: 1.9km of heliports, 5.6km of airports, controlled airspace, 30m of another person except for a crew member or other person involved in the operation. Acquire permission to fly from landowner.
 - Only fly within visual line of sight (VLOS)
 - Complete pre-operational check of RPAS to ensure equipment is in working order.
 - Only RPAS trained and certified personnel may operate RPAS.

4.0 CHECKLIST

- Attend all preparatory meetings (IE: daily PSI; job scope; review of JSA's and SOP's for the job).
- Complete FLRA cards before starting the work.
- Ensure all personnel involved in the task are aware of the hazards and the controls to be used, as identified in the SOP's; JSA's; and FLRA's
- Conduct a pre-job inspection of all equipment to be worked on and tools to be used.
- Standard of Training required for working on this job: On-the job training.**

5.0 DEFINITIONS

5.1 Company

Means North American Construction Group Ltd. (NACG) and all directly or indirectly owned subsidiary companies, including joint ventures.

5.2 Company Personnel

Includes the Company's employees, officers, directors, agents, associates, consultants/contractors, temporary employees, and third-party processors.

5.3 HSE

Health, Safety & Environment.



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5.4 VLOS

Visual Line of Sight.

5.5 ROC-A

Restricted Operators Certificate – Aeronautical.

5.6 RPAS

Remotely Piloted Aircraft System.

6.0 PROCEDURE

6.1 General Survey – Sequence of Job Tasks

- 1) Pre-Job planning.
- 2) Identify location of work area and verify emergency response procedures.
- 3) Complete FLRA. Note Safe Work Permit number on FLRA if applicable.
- 4) Pre-Inspection walk around.
- 5) Drive to work area.
- 6) Walk through rugged terrain (staking and topographic surveys).
- 7) Hammer frost pins into the ground in the summer and winter to create hole for stakes.
- 8) Hammer stakes into the ground.
- 9) Carry 30lb stake bag on shoulder for extended periods of time.

6.2 RPAS Operations

6.2.1 Day before the Flight

- 1) Check weather forecasts on several websites to assess probable flight conditions and plan on best time to fly.
- 2) Perform 360° check of craft and address any issues that are found.
- 3) Load or create new flight plan in flight software.
- 4) Ensure the flight area is not within: 1.9km of a heliport, 5.6km of an airport, controlled airspace, 30m of another person except for a crew member or other person involved in the operation.
- 5) Acquire permission to fly from landowner.
- 6) Ensure certificate of registration, insurance, pilot certificate and ROC-A are in the RPAS case.

6.2.2 Day of Flight

- 1) Ensure all flight batteries, camera batteries, GNSS base station batteries, flight computer, aviation radio, site radio, and remote control are charged.
- 2) Obtain permit from site permit center if required.
- 3) Drive to flight area, assess all hazards and select best area to setup away from heavy equipment traffic.
- 4) Complete all pre-flight briefing and checklists. Reference all applicable operations manuals.
- 5) Complete RPAS flights with automatic or manual controls.
- 6) Complete all post-flight briefing and checklists.

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7.0 NOTES

If this task is to be done by a method different than described in this SOP, the work must **STOP** and the alternate method must be **DOCUMENTED** with an adequate hazard assessment tool such as a JSA or Management of Change process. The document must be **APPROVED** by a supervisor before such procedures are implemented.

8.0 REFERENCES

- 960C-SOP-504 Hand Tools, Use of
- 950C-C-006 Cold Stress Code
- 950C-C-030 Heat Stress Cold
- 962C-SOP-042 Approaching Equipment

9.0 APPENDICES

- No appendices.