

STATE OF OHIO (DAS) CLASSIFICATION SPECIFICATION	CLASSIFICATION SERIES: Survey Technician	SERIES NO.: 8421
	MAJOR AGENCIES: Administrative Services, Agriculture, Natural Resources, Transportation	EFFECTIVE DATE: 10/01/2017

SERIES PURPOSE:

The purpose of the survey technician occupation is to operate survey instruments & equipment to obtain data for boundary control, engineering surveys & construction projects.

At the lower levels, incumbents either operate basic survey equipment & receive training in operation of more complex instruments or operate more complex survey instruments to obtain survey data.

At the higher level, incumbents act as survey crew leader & provide work direction & training in use of survey instruments.

Glossary of Terms:

The following terms are to be interpreted to mean the following whenever they appear in this classification specification;

Base maps: 1) A map of the project's study area showing topography, roads, streams, project limits, property lines, ownership & other items of interest. 2) In CADD, a file containing information for the project area, which is referenced into sheet files showing specific portions of the project.

Basic survey equipment/instruments: rod, chain, tape, plumb bob, hand level with cross hairs.

Boundary Survey: All surveys relating to the establishment or retracement of property boundaries & completed in accordance with Ohio Administrative Code Chapter 4733-37, a survey used to ascertain the boundary line, natural or artificial, dividing two parcels of real estate.

Complex survey equipment/instruments: transit, digital level, theodolite, Terrestrial Laser Scanner, Total Station Electronic measuring devices, Global Positioning Systems (GPS) receiver.

Computer-Aided Drafting & Design (CADD): Use of computers in designing, drafting, &/or modeling projects, plans or structures. CADD is the preferred method of preparing plans for the Ohio Department of Transportation (ODOT).

Coordinate Geometry (COGO): A method for calculating coordinate points from surveyed bearings, distances, & angles. Automated mapping software used in land surveying that calculates locations using distances & bearings from known reference points.

Field Survey: Any type of survey work done at the project site, including topographic survey, boundary survey, location & recovery of boundary monuments, control survey, etc.

Geodetic Science: Geodetic Science is concerned with the size & shape of the Earth, the realization of terrestrial reference frames, & the estimation of spatial coordinates, Earth orientation parameters, crustal deformation, tides, the mean & time-variable gravity field, & mass fluxes associated with the Earth system.

Geographic Information Systems (GIS): A computerized data management system designed to capture, store, retrieve, analyze, & report on geographic & demographic information.

Global Positioning System (GPS): A system of satellites, computers, & receivers that is able to determine the latitude & longitude of a receiver on Earth by calculating the time difference for signals from different satellites to reach the receiver.

Land Surveying: Land surveying can include associated services such as mapping & related data accumulation, construction layout surveys, precision measurements of length, angle, elevation, area, & volume, as well as horizontal & vertical control surveys, & the analysis & utilization of land survey data.

Right of Way: A strip of land occupied or intended to be occupied by transportation & public use facilities, such as roadways, railroads, & utility lines. The land is either owned outright or controlled by easement by the public agency. Also, see ORC 4511.01 Traffic Laws – Operation of motor vehicles definitions - (UU) “Right of way”.

Right of Way Plans: A portion of a highway plan showing a graphical representation of a highway improvement & its relation to adjacent property, the parcel or portions thereof needed for highway purposes, & other pertinent information.

Right of Way Survey: A survey performed for the purpose of laying out an acceptable route for an easement or right of way for a road, pipeline, utility, or transmission line. This survey would include the establishment of all boundary lines & road crossings along the route.

<u>JOB TITLE</u>	<u>JOB CODE</u>	<u>PAY GRADE</u>	<u>EFFECTIVE</u>
Survey Technician 1	84211	26	06/26/1994

CLASS CONCEPT:

The developmental level class works under immediate supervision & requires working knowledge of & skill in operation of basic survey measuring devices (i.e., rod, chain, tape, plumb bob, & hand level with cross hairs) to assist higher-level-survey technicians in obtaining & downloading survey data & receive training in use of more complex survey instruments (e.g., transit; digital level; theodolite; Total Station Electronic measuring devices; GPS receiver).

<u>JOB TITLE</u>	<u>JOB CODE</u>	<u>PAY GRADE</u>	<u>EFFECTIVE</u>
Survey Technician 2	84212	28	10/01/2017

CLASS CONCEPT:

The full performance level class works under general supervision & requires considerable knowledge of surveying & skill in operation of basic & complex survey measuring instruments in order to set up & operate equipment to obtain survey data, perform calculations for determination of precise measurements & process & adjust survey data into CADD drawings.

<u>JOB TITLE</u>	<u>JOB CODE</u>	<u>PAY GRADE</u>	<u>EFFECTIVE</u>
Survey Technician 3	84213	30	10/01/2017

CLASS CONCEPT

The full performance level class works under general supervision & requires considerable knowledge of surveying & skill in operation of all types of survey measuring instruments in order to coordinate logistics & strategic planning for field survey/construction projects &/or acts as survey crew leader.

<u>JOB TITLE</u>	<u>JOB CODE</u>	<u>B. U.</u>	<u>EFFECTIVE</u>	<u>PAY GRADE</u>
Survey Technician 1	84211	07	06/26/1994	26

JOB DUTIES IN ORDER OF IMPORTANCE: (These duties are illustrative only. Incumbents may perform some or all of these duties or other job-related duties as assigned.)

Operates basic survey measuring devices (i.e., rod, chain, tape, plumb bob) to assist in obtaining precise measurements of designated area.

Clears brush & foliage from line of survey; sets up targets on tripods over points for measurements; locates &/or sets monuments, pins or stones; marks survey points for identification; takes field notes on topographic sketches; sets up traffic control (e.g., signs, cones); flags traffic through survey area.

Assists in maintenance of survey equipment; cleans & services survey trucks/vans; stocks survey truck/van with necessary supplies & equipment for field work.

Receives training in operation of more complex survey devices (e.g., theodolite, transit, data collector/recorder, electronic distance measurer, automatic level, plotting of field data for the preparation of survey drawings).

MAJOR WORKER CHARACTERISTICS:

Knowledge of geometry; trigonometry; surveying*. Skill in operation of basic survey measuring devices (i.e., rod, chain, tape, plumb bob)*; operation of more complex measuring devices (e.g., transit; theodolite; geodimeter; data collector/recorder, electronic distance measurer, automatic level)*. Ability to understand system of procedures; read, copy & record figures; gather, collate & classify data; demonstrate physical agility; lift 50 pounds; cooperate with co-workers.

(*)Developed after employment.

MINIMUM CLASS QUALIFICATIONS FOR EMPLOYMENT:

1 course or 3 mos. exp. in geometry; 1 course or 3 mos. exp. in trigonometry; must be able to provide own transportation.

-Or 3 mos. trg. or 3 mos. exp. in field survey; must be able to provide own transportation.

-Or equivalent of Minimum Class Qualifications For Employment noted above.

TRAINING AND DEVELOPMENT REQUIRED TO REMAIN IN THE CLASSIFICATION AFTER EMPLOYMENT:

Not applicable.

UNUSUAL WORKING CONDITIONS:

Exposed to inclement weather, traffic, rough terrain, poisonous plants & insects; may work flexible hours; may work in shallow water/boat; requires travel.

<u>CLASS TITLE</u>	<u>CLASS NUMBER</u>	<u>B. U.</u>	<u>EFFECTIVE</u>	<u>PAY RANGE</u>
Survey Technician 2	84212	07	10/01/2017	28

JOB DUTIES IN ORDER OF IMPORTANCE: (These duties are illustrative only. Incumbents may perform some or all of these duties or other job-related duties as assigned.)

Assists higher-level survey technicians & performs necessary evaluations of field conditions to provide engineering staff accurate & detailed digital model of existing terrain & topography; sets up & operates complex survey instruments (e.g., Total Station Electronic measuring devices, Digital levels, Terrestrial Laser Scanners; Global Positioning Systems (GPS) Receivers, Global Positioning Systems (GPS) Rover Receiver w/Data Collector) to obtain survey data, enters field & mapping codes in Data Collector to automate preparation of CADD files, assists in preparation of field notes, performs calculations for determination of precise measurements (e.g., elevations, horizontal & vertical lines, boundaries, cross sections, curves, angles), assists in evaluation of condition of drainage structures (e.g. catch basins, manholes & culverts) & utilizes software applications to upload & download survey data (e.g., uses personal computer to transfer information obtained from data collectors; creates data files; utilizes software applications such as Electronic Data Processing (e.g. Microsoft Excel), CADD, Coordinate Geometry (Cogo) & GPS Software (e.g. Trimble Business Center) to perform survey calculations & to create survey drawings or project files).

Receives training in Geodetic Science (e.g. Datums, State Plane Coordinates, Geoids & Adjustments), safety (e.g. work zone set up, flagging, identification of confined spaces) & conducts field & office work in accordance with department standards.

Performs office related surveying activities, utilizes surveying software to download & process spatial data for analysis; performs spatial data alignment & orientation relative to established control; stays abreast of new technology & developments as they relate to position.

Sets, recovers or locates monuments, pins, stakes or related survey markers to identify boundaries &/or other survey control points, verifies accuracy of distance & elevation measurements; clears brush & foliage from line of survey; sets up targets for measurements; takes field notes on topographic sketches; sets up traffic control (e.g., signs, cones); flags traffic through survey area; carries field equipment through rough terrain (e.g., across creeks, up/down hills, over fences, through marshes); assists in maintenance of survey equipment; use of survey software applications; cleans & services survey trucks/vans; stocks survey truck/van with supplies & equipment for field work; operates state vehicles (e.g., trucks, vans, off road equipment) to transport equipment & instruments to various project sites.

Conducts research of public property records from local government sources such as county recorder's office, county auditor, county treasurer, county commissioners, county engineers, township offices, private survey firms, Ohio State Archives, Ohio State Auditors Land Office, Ohio Historical Society Library; performs record keeping functions to include taking field notes, makes topographical sketches; performs office functions such as data entry, typing &/or word processing; communicates with general public &/or property owners to obtain information concerning boundary evidence, property lines, corner monuments.

Identifies tree species & other vegetation for environmental preservation, economic reimbursements & safety factors; clears brush & other obstacles as required to facilitate surveying operations with appropriate equipment (e.g., machete, chain saw); operates various hand tools & small equipment (e.g., jackhammer, power auger, shovel, posthole digger, sledgehammer, spud bar).

MAJOR WORKER CHARACTERISTICS:

Knowledge of: geometry; trigonometry; surveying; federal, state & local government laws, regulations, policies, procedures pertaining to surveying*; OSHA & agency safety practices*.

Skill in: operation of survey instruments (e.g., Total Station Electronic measuring devices, digital levels, Terrestrial Laser Scanners; Global Positioning Systems (GPS) Receivers, Global Positioning Systems (GPS) Rover Receiver w/Data Collector); operation of personal computer & Electronic Data Processing (e.g. Microsoft Excel), software; operation of motor vehicle to transport survey equipment to & from survey sites.

Ability to: understand system of procedures; read, copy & record figures; gather, collate & classify data; use research methods in gathering data; cooperate with co-workers on group projects; demonstrate physical fitness to hike long distances & transport & set up equipment weighing up to 75 lbs. in tight tolerances &/or over hills & rough terrain.

(*)Developed after employment.

MINIMUM CLASS QUALIFICATIONS FOR EMPLOYMENT:

Completion of associate core program in geometrics engineering, surveying & mapping, surveying engineering, land surveying engineering, civil engineering, construction technology or geographic information systems; valid drivers' license.

-Or National Society of Professional Surveyors (NSPS) & American Congress on Surveying & Mapping (ACSM) Certified Survey Technician Level 2; valid driver's license.

-Or 18 mos. exp. working on survey field crew; performing duties commensurate with approved PD on file, valid driver's license.

-Or equivalent of Minimum Class Qualifications for Employment noted above.

TRAINING AND DEVELOPMENT REQUIRED TO REMAIN IN THE CLASSIFICATION AFTER EMPLOYMENT:

Not applicable.

UNUSUAL WORKING CONDITIONS:

Exposed to inclement weather, traffic, loud noise, rough terrain, ditches with water & sewage, poisonous plants & insects; may work flexible hours; may work in shallow water/boat; requires travel.

<u>CLASS TITLE</u>	<u>CLASS NUMBER</u>	<u>B. U.</u>	<u>EFFECTIVE</u>	<u>PAY RANGE</u>
Survey Technician 3	84213	07	10/01/2017	30

JOB DUTIES IN ORDER OF IMPORTANCE: (These duties are illustrative only. Incumbents may perform some or all of these duties or other job-related duties as assigned.)

Coordinates logistics & strategic planning for field survey/construction projects &/or acts as survey crew leader (e.g., plans field operations including utilization of surveying tools & personnel, ensures safety of field crew by identifying confined spaces, setting up work zones, flagging traffic), obtains survey data for construction projects, evaluates condition of drainage structures (e.g. catch basins, manholes & culverts) or boundary control & engineering surveys for completion of technical survey tasks, enters field & mapping codes in Data Collector to automate preparation of CADD files, performs calculations for boundary locations, datum transformations, adjustments & geoid transformations under direction of a surveyor, calculates pertinent statistical values of survey data sets, assists surveyor to check consultant survey data to ensure departmental standards are met, performs modeling of high resolution data to create solid surfaces for measurement purposes & processes & adjusts GPS data.

Utilizes software applications to prepare survey plats &/or maps; instructs, advises & trains lower-level survey technicians in theory, practice & methods of surveying, use of survey software applications & in operation, care & maintenance of survey instruments; uses personal computer to upload/download information obtained from data collectors; creates data files; utilizes software applications such as Electronic Data Processing (e.g. Microsoft Excel), CADD, Coordinate Geometry (Cogo) & GPS Software (e.g. Trimble Business Center) to perform survey calculations & to create survey drawings or project files); stays abreast of new technology & developments as they relate to position.

Sets up & recovers monuments, pins, stakes or related survey markers in order to identify boundaries &/or other survey control points; verifies accuracy of distance & elevation measurements; clears brush & foliage from line of survey; sets up & operates survey instruments (e.g., Total Station Electronic measuring devices, Digital levels, Terrestrial Laser Scanners; Global Positioning Systems (GPS) Receivers, Global Positioning Systems (GPS) Rover Receiver w/Data Collector) to obtain survey data, sets up targets on tripods over points for measurements; takes field notes on topographic sketches; flags traffic through survey area; carries field equipment through rough terrain (e.g., across creeks, up/down hills, over fences, through marshes), identifies tree species & other vegetation for environmental preservation, economic reimbursements & safety factors; assists in maintenance of survey equipment; cleans & services survey trucks/vans; stocks survey truck/van with necessary supplies & equipment for field work; operates state vehicles (e.g., trucks, vans, off road equipment) to transport equipment, instruments to various project sites.

Researches state, county & municipal records relative to accurate completion of preliminary & boundary surveys; conducts extensive deed & title research / investigation of property records from local government sources such as county recorder's office, county auditor, county treasurer, county commissioners, county engineers, township offices, private survey firms, Ohio State Archives, Ohio State Auditors Land Office, Ohio Historical Society Library; takes notes, searches records, land deeds & titles; prepares notes to present clear view of project; does mathematical computations.

Contacts supervisors, utilities, planners & property owners concerning survey work; sets up traffic control; operates all survey equipment as required; drafts or plots survey drawings from field data or office calculations.

Identifies tree species & other vegetation for environmental preservation, economic reimbursements & safety factors; clears brush & other obstacles as required to facilitate surveying operations with appropriate equipment (e.g., machete, chain saw); operates various hand tools & small equipment (e.g., jackhammer, power auger, shovel, posthole digger, sledgehammer, spud bar).

MAJOR WORKER CHARACTERISTICS:

Knowledge of: geometry; trigonometry; statistics; surveying; employee training & development*; federal, state & local government laws, regulations, policies, procedures pertaining to surveying*; OSHA & agency safety practices*.

Skill in: operation of surveying instruments (e.g., Total Station Electronic measuring devices, digital levels, Terrestrial Laser Scanners; Global Positioning Systems (GPS) Receivers, Global Positioning Systems (GPS) Rover Receiver w/Data Collector); operation of personal computer & Electronic Data Processing (e.g. Microsoft Excel), software; operation of motor vehicle to transport equipment & instruments.

Ability to: apply principles to solve practical, everyday problems; read, copy & record figures; gather, collate & classify data; use research methods in gathering data; demonstrate physical fitness to hike long distances & transport & set up equipment weighing up to 75 lbs. in tight tolerances &/or over hills & rough terrain.

(*)Developed after employment.

MINIMUM CLASS QUALIFICATIONS FOR EMPLOYMENT:

Completion of undergraduate core program of applied science in geometrics engineering, surveying & mapping, surveying engineering, land surveying engineering, civil engineering, geographic information systems or construction technology; 12 mos. trg. or 12 mos. exp. working on a survey field crew performing duties commensurate with approved PD on file; valid driver's license.

-Or completion of associate core program of applied science in geometrics engineering, surveying & mapping, surveying engineering, land surveying engineering, civil engineering, geographic information systems or construction technology; 18 mos. trg. or 18 mos. exp. working on survey field crew performing duties commensurate with approved PD on file; valid driver's license.

-Or National Society of Professional Surveyors (NSPS) & American Congress on Surveying & Mapping (ACSM) Certified Survey Technician Level 3; valid driver's license.

-Or 36 mos. exp. working on survey field crew; performing duties commensurate with approved PD on file, valid driver's license.

-Or 18 mos. exp. as Survey Technician 2, 84212; valid driver's license.

-Or equivalent of Minimum Class Qualifications for Employment noted above.

TRAINING AND DEVELOPMENT REQUIRED TO REMAIN IN THE CLASSIFICATION AFTER EMPLOYMENT:

Not applicable.

UNUSUAL WORKING CONDITIONS:

Exposed to inclement weather, traffic, loud noise, rough terrain, ditches with water & sewage, poisonous plants & insects; may work flexible hours; may work in shallow water/boat; requires travel.