

Appendix F. Snow Removal Equipment (SRE) Estimation

Executive Summary

The PUB Snow Removal Equipment (SRE) eligibility assessment follows the process outlined in AC 150-5220-20A, *Airport Snow and Ice Control Equipment*. The findings are that PUB is eligible for a total of eight dedicated SRE vehicle chassis, with a combination of attachments as they prefer. The combination of functions in a particular vehicle and equipment attachments is a choice for PUB to make, but based on the guidance PUB is eligible for vehicles and attachments to have at least two dedicated Class V rotary plows (blowers) with 4,000 ton per hour capacity; four dedicated very-large runway plow trucks with plow blades at least 25 feet long; a large sweeper broom truck with a 25-foot broom, and a material spreader vehicle with 6 cubic-yard hopper as support. The SRE inventory at PUB currently does not have the capacity to meet the snow clearance time of ½ hour as determined by the operations level, size of Priority 1 paved areas, and commercial airport standards. Should PUB acquire a combo-truck that has attachments for blower/blade/broom it should not interfere with acquisition of additional plow/spreader trucks and a separate sweeper truck.

The recommendations made are to replace the existing SRE vehicles that do not meet standards and exceed the expected useful lifespan. Cost effectiveness for maintenance, repair and reliability are justifications for replacement. As a general practice, when equipment is aged 10-15 years it would be a reasonable expectation to acquire a replacement. Equipment condition and serviceability will vary depending on shelter, frequency of use and maintenance practices.

The key for Airport Improvement Program (AIP) eligibility is to have sufficient equipment to clear the Priority 1 areas identified in the snow and ice control plan within ½ hour and leave the runways bare and wet. One-hour is the standard time allowed for commercial airports with greater than 40,000 annual aircraft operations to clear the Priority 1 paved surfaces. That standard of outcome requires vehicles that plow, blow, sweep and de-ice to work together simultaneously. Operational flexibility is gained where attachments can be switched out quickly. Should a vehicle experience a mechanical failure, another vehicle can be configured to replace it with minimal loss in operational effectiveness. There are also variables in snow removal activity and areas of use that can be accommodated through equipment configuration changes. Once the Priority 1 areas are cleared, vehicles can serve the needs of secondary areas as identified in the snow and ice control plan. A plow truck that has a 25-foot plow for the runway can be converted to a box type pusher plow for apron clearing operations. A sweeper broom can also be used during the rest of the year for Foreign Object Debris (FOD) control. Multiple uses and multiple configurations allow PUB to have greater utilization of the vehicles which equates to greater value for the dollar.

The smaller SRE vehicles PUB acquired through non-AIP funding sources or are still operationally viable can serve the additional support function to clear aprons, access roads, taxiways, and hangar areas. These areas are not included in the FAA's AIP SRE eligibility determination but that doesn't mean the AIP funded equipment can't be used there. The AIP grant assurance requirement is such that the AIP funded equipment shall not be used for landside public roads and other off-airport surfaces. PUB could utilize any non-AIP funded equipment to support off-airside snow removal operations.

Introduction

The Federal Aviation Administration (FAA) standards and other guidance for SRE are found in AC 150-5220-20A for use in the purchase of AIP funded snow removal and ice control equipment. In general, use of this AC is not mandatory. However, use of this AC is mandatory for all projects funded with federal grant monies through the AIP and/or with revenue from the Passenger Facility Charge (PFC) Program.

This section explains the selection process for SRE provided by AC 150/5220-20A. Some of the equipment is determined using only the first step in the process while the remaining equipment follows a two-step process. Both steps apply the same assumption, which is to remove 1 inch of snow weighing up to 25 pounds per cubic foot from the Priority 1 paved area within a specified time for the airport's annual aircraft operations. In the case of PUB, this is based on its classification as a commercial service airport with 196,260 operations per year. Furthermore, the AC applies an equipment efficiency factor equal to 70 percent. This assumption takes into account the need by such equipment to slow down and to change course (for example, approaching the end of a runway to reverse course), back-and-forth clearing operations common on stub taxiways and connector taxiways, and to account for slight snow spillage, slight overlapping of clearing operations, and poor visibility driving conditions.

Step 1 – Determination of Priority 1 paved areas

An airport's snow plan Priority 1 paved area is defined as the primary runway (which depends on wind direction), parallel taxiway, airport road, terminal ramp, ATCT access, and ARFF access. For equipment calculations, the larger runway and taxiway surface area is used for the calculation of areas to be cleared.

Runway 8R/26L is 10,498 feet long and 150 feet wide, giving a surface area of 1,574,700 square feet. Taxiway A is the full-length parallel taxiway for Runway 8R-26L. With a width of 75 feet and length of 10,543 feet, the parallel taxiway is 790,725 square feet. There are seven taxiway connectors between Taxiway A and Runway 8R/26L, with filets and the taxiway connector length they equal 4,986 feet in length and 75 feet wide, giving a surface area of 373,950 square feet. The surface area to be cleared as Priority 1 include the runway and taxiways for a total of 2,739,375 square feet.

Additional areas to be cleared as Priority 1 include the Airport Traffic Control Tower (ATCT) and Aircraft Rescue and Fire Fighting (ARFF) access. The distance inside the airport operations area from the ARFF

doors to Taxiway A is 500 feet. At 20 feet wide, the path to be cleared is 10,000 square feet. The remaining pavement to be cleared as a Priority 1 area is the terminal apron and it is approximately 106,000 square feet. **TABLE 1** provides the total calculated Priority 1 pavement area at PUB.

TABLE 1 Priority 1 Areas (Square Feet)

LOCATION	PAVED AREAS (SQUARE FEET)
Main Runway (10,498' x 150')	1,574,700
Parallel Taxiway (10,543' x 75')	790,725
Seven taxiway connectors and fillets	373,950
ARFF Station access to Taxiway A	10,000
Terminal Apron	106,000
Total Priority 1 Paved Area	2,855,375

SOURCE: Mead & Hunt 2020.

Step 2 – Minimum SRE Requirements

The required minimum types and number of SRE equipment is based on several factors. Two parameters, namely the total square footage of the Priority 1 paved area and the airport's service classification, determine the types and number of runway brooms, solid material spreaders, and liquid material spreaders. The second parameter, selection of high-speed rotary plows and snowplows requires the tonnage of snow to be removed in a given time in addition to other parameters required by the equipment. Because high-speed rotary plows dictate the general clearing operation, supportive snowplows are selected with the condition that they match the speed and the snow removal capacity (tonnage per hour) of the high-speed rotary plow.

Commercial Service Airports

Commercial service airports with over 40,000 operations and more than 12 inches of annual snowfall should have a minimum of one high-speed rotary plow supported by two snowplows of equal snow removal capacity. National Weather Service records state that Pueblo Colorado receives an average of 31.3 inches of snow per year. **FIGURE 1** presents the monthly climate summary with averages recorded.

FIGURE 1 Pueblo Climate Data

PUEBLO WB AP, COLORADO (056738)													
Period of Record Monthly Climate Summary													
Period of Record : 09/01/1872 to 06/30/1954													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	47.2	52.2	54.8	66.8	74.0	86.1	90.2	88.0	81.9	71.0	56.0	48.6	68.1
Average Min. Temperature (F)	15.7	19.3	23.5	36.1	45.2	55.6	60.5	58.4	50.0	36.4	23.2	16.5	36.7
Average Total Precipitation (in.)	0.40	0.19	0.68	1.09	1.78	1.23	2.01	1.74	0.56	0.51	0.32	0.25	10.75
Average Total SnowFall (in.)	5.9	3.1	7.8	2.8	1.7	0.0	0.2	0.0	0.0	0.9	5.0	3.9	31.3
Average Snow Depth (in.)	1	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
 Max. Temp.: 100% Min. Temp.: 100% Precipitation: 100% Snowfall: 100% Snow Depth: 99.7%
 Check [Station Metadata](#) or [Metadata graphics](#) for more detail about data completeness.

Western Regional Climate Center, wrc@dr.edu

Other Supporting Equipment

Other types of supporting equipment such as front wheel loaders or ice-melters may be needed to assist in the removal of snow from all non-critical, remaining operational areas including secondary taxiways or low priority aprons. AC 150/5200-30, *Airport Winter Safety and Operations* classifies such paved areas as Priority 2 or Priority 3 areas.

Selecting High-Speed Rotary Plows

High-speed rotary plows, also called “rotaries” or “snowblowers”, are used to cast heavy concentrations of plowed snow away from movement areas such as runways and taxiways. The selected high-speed rotary plow(s) should be capable of removing the volume of snow from the Priority 1 paved area with a pre-determined casting distance to comply with runway and taxiway snow-bank clearance criteria contained in AC 150/5200-30. This equipment, which may be self-propelled or attached to a conventional carrier vehicle, uses either one or more rotating elements to disaggregate a snowpack. The disaggregated snow is then broken into particles small enough to pass through a casting mechanism having a directional chute. Because of their large capacity, self-propelled high-speed rotary plows are frequently required at medium to large airports while high-speed rotary plows attached to a conventional carrier vehicle may be more appropriate at smaller facilities or facilities whose climate is less severe.

The size and number of high-speed rotary plows needed is based on the following conditions:

- Annual activity level equals greater than 40,000 operations with a reasonable clearance time of ½ hour for total Priority 1 paved areas.
- Accumulated snow on the runway and taxiway are to be cast at least 100 feet from the rotary plow when it travels along the paved edge. The casting distance sets equipment selection criterion 1.
- Average runway operating speed of the rotary plow unit is at least 25 mph to meet the reasonable clearance time of ½ hour based on the annual aircraft operations.
- Typical snow density is 25 lbs/ft³.

Sub-Step 1 – Determine the total critical area for Priority 1

As determined above, the Priority 1 paved area is 2,855,375 square feet.

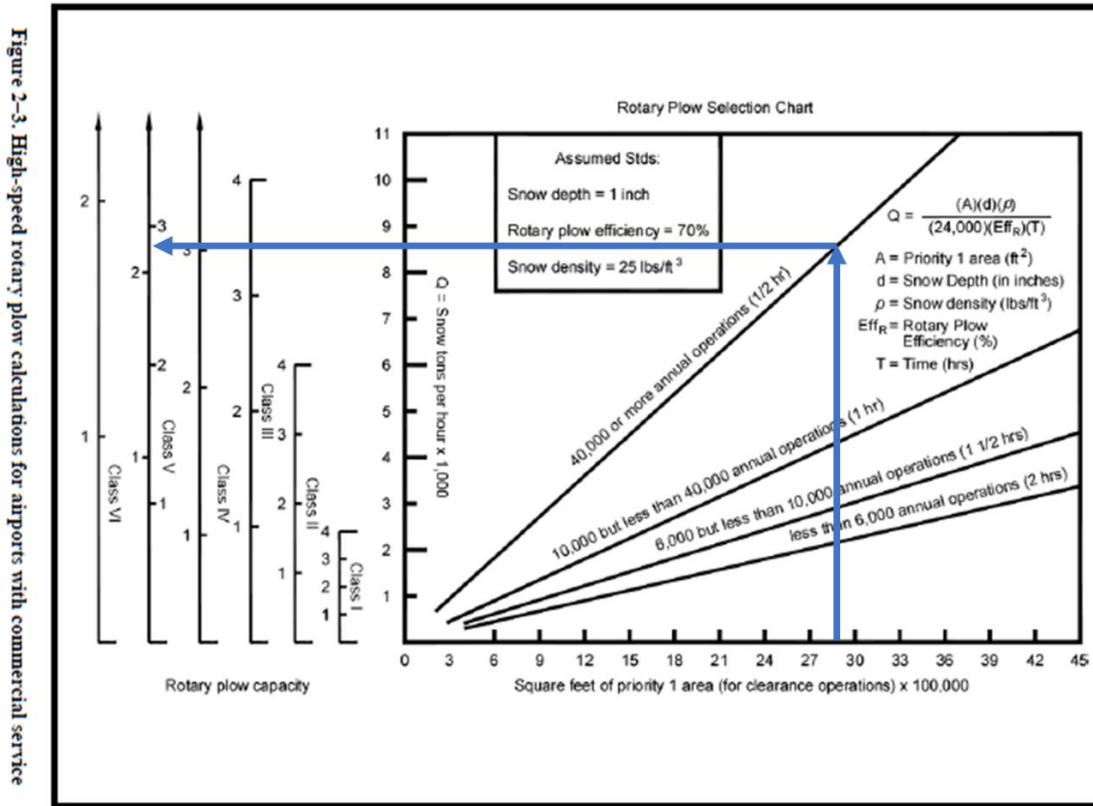
Sub-Step 2 – Use of Graph (FAA AC 5220-20A Figure 2-4)

Using the chart provided in **FIGURE 2**, start along the bottom scale for square feet of Priority 1 paved area, rounding up to the next 100,000 square feet. For PUB, the total area for Priority 1 equals 2,900,000 square feet. Go up the chart from 29 to the greater than 40,000 annual aircraft operations line. As a commercial service airport with more than 40,000 annual aircraft operations, PUB clearance time allowed is ½ hour. Moving from that position to the left side of the chart identifies the tons of snow to be removed per hour. The chart provides an expectation of 8,500 tons of snow per hour (assuming one inch of snow accumulation). To determine the number of rotary plows, continue the line to the left. PUB's Priority 1 paved area to be cleared in ½ hour requires two Class V rotary plows, each casting 4,000 tons of snow per hour.

PUB is currently equipped with one medium Class II rotary plow that does not meet the ½ hour clearance time requirement of 8,500 tons per hour. It is also over 26 years old and well past its life expectancy.

Rotary Plow Recommendation: It is recommended that PUB acquire two Class V vehicles, each moving up to 4,000 tons of snow per hour, to meet the ½ hour time clearing requirement.

FIGURE 2 Rotary Plow Selection Chart

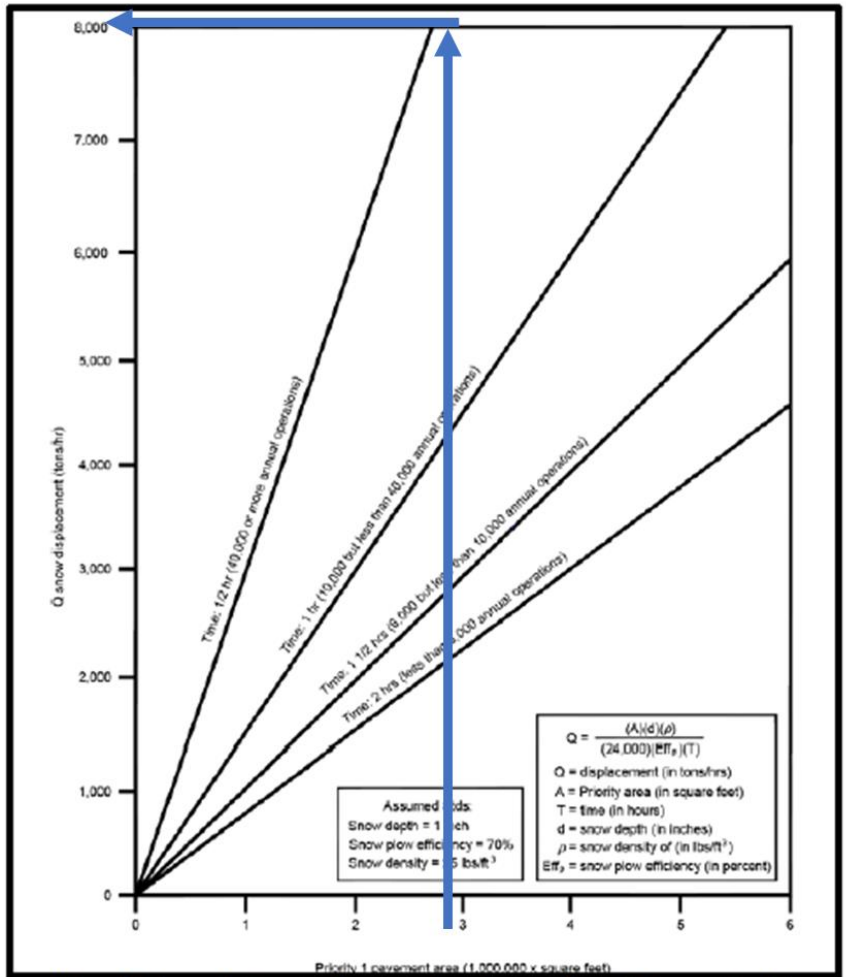


SOURCE: FAA AC 5220-20A Figure 2-3.

Selecting Snowplows

Snowplows consist of a cutting edge to shear snow from the pavement, and a moldboard to lift and cast the dislodged snow to the side of the cleared path. The cutting edge may ride in contact with the pavement or be held a small distance above it by means of shoes or caster wheels. A complete snowplow unit consists of the snowplow, a carrier vehicle (conventional or dedicated), hitch, and other accessories. Similar to the rotary plow determination process, AC 150/5220-20A requires use of Figure 2-5 to determine the amount of snow to be moved per hour for a commercial service airport. **FIGURE 3** provides the results, which are similar to the rotary plow determination for amount of snow to be removed per hour at 8,500 tons. Using the recommended 2 to 1 ratio of plows to rotary plows, there is a need for four snowplows at PUB.

FIGURE 3 Tons of Snow to be Removed Per Hour



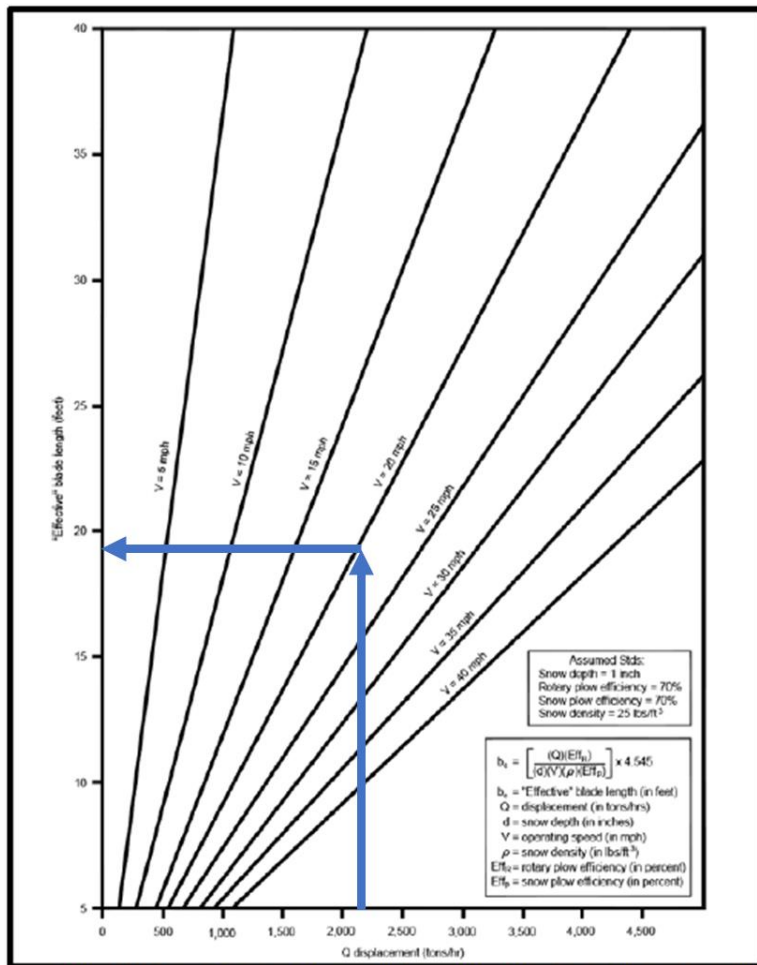
Note: Use the provided equation when priority 1 paved areas yield snow displacement (tons/hr) amounts greater than what the chart provides. When using the chart do not interpolate between clearance times.

Figure 2-5. Snow removal (tons/hr) for Priority 1 paved areas for commercial service airports

SOURCE: FAA AC 5220-20A Figure 2-5.

To determine the effective cutting edge of the snowplow blade at the required minimum operating speed of 25 mph, AC 150/5220-20A recommends use of Figure 2-7 with snow displacement provided in tons/hour. The capacity of tons per hour is shared by four support plows, which is 2,125 tons per vehicle. As presented in **FIGURE 4**, the cutting-edge effective blade length is recommended to be 20 feet.

FIGURE 4 Snowplow Blade Cutting Edge Determination



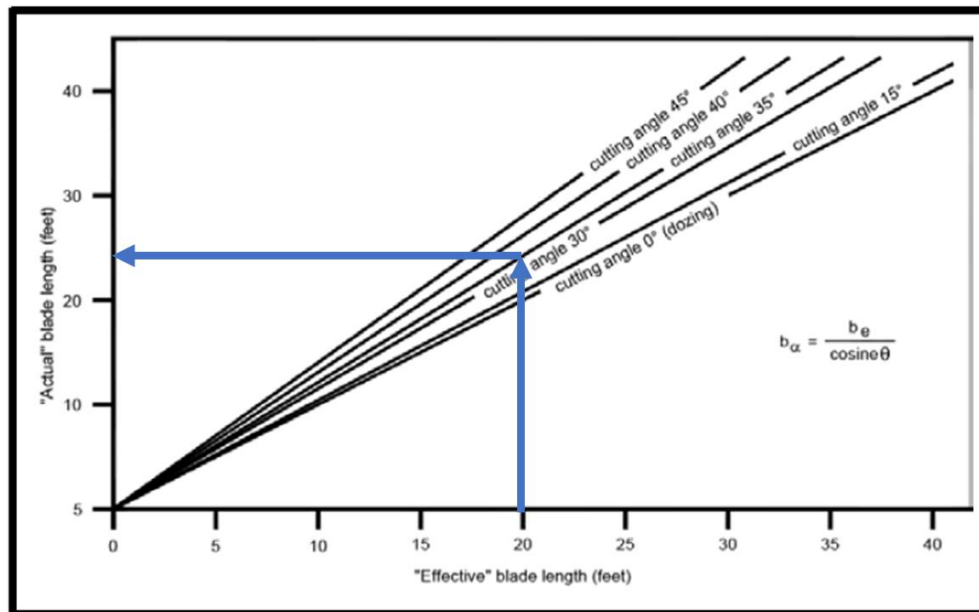
Note: Use the provided equation when snow displacement (tons/hr) needs to exceed the amount provided by the chart. When using the chart do not interpolate between speeds.

Figure 2-7. Effective snow plow blade length related to snow displacement

SOURCE: FAA AC 5220-20A Figure 2-7.

To determine the actual cutting-edge snowplow blade length another chart is used. AC 150/5220-20A Figure 2-8 provides the effective snowplow blade length with the assumption being the blade is angled at 35 degrees to displace snow to one side. As presented in **FIGURE 5**, to provide at least 20 feet of effective cutting edge, the snowplow blade should be at least 25 feet wide.

FIGURE 5 Snowplow Blade Cutting Edge Determination



SOURCE: FAA AC 150/5220-20A Figure 2-7.

Snowplow sizes are categorized as follows:

- **Small snowplow.** This category includes snowplows with cutting edge lengths ranging from approximately 6 feet up to 10 feet. Included in this category are underbody-mounted truck scrapers with similar length cutting edges.
- **Intermediate snowplow.** This category includes snowplows with cutting edge lengths ranging from approximately 10 feet up to 15 feet. Included in this category are underbody-mounted truck scrapers with similar length cutting edges.
- **Large snowplow.** This category includes snowplows with cutting edge lengths ranging from approximately 15 feet up to 22 feet. Included in this category are ramp dozer plows and large special purpose plows.
- **Extra-large snowplow.** This category includes plows with cutting edge lengths greater than 22 feet. Included in this category are ramp dozer plows and extra-large special purpose plows.

With a requirement for snowplows equipment with blades 25 feet wide, PUB is recommended to have four extra-large snowplows. This includes equipment for specialty plow blades that can be used for ramps to collect and load snow for removal. Specifications for types of plow equipment purchased new are provided by SAE International ARP (Airport) 5943 in Section 4-3 of AC 150/5220-20A.

PUB is currently equipped with three small snowplows, three intermediate snowplows, and one large snowplow.

Recommendation for Plow Trucks: It is recommended that PUB acquire four new extra-large plow trucks capable of utilizing 25-foot snowplow blades.

Additional Equipment Selection

Material Spreader

The function of a material spreader is to provide a continuous, unrestricted, accurately metered flow of sand and solid or liquid deicers/anti-icers per AC 150/5200-30 to a pavement surface over a predetermined spread area. Spreader units may be permanently mounted on vehicles, a slip-in hopper, or they may be towed by a carrier vehicle. A spreader unit consists of a material storage compartment (hopper or tank), pre-wetting mechanism, a feed mechanism to carry the material to the discharge opening, a metering device to control the application rate, and a distribution mechanism. The selection of a material spreader is primarily defined by the carrying capacity of the hopper (cubic yards) or tankage (gallons) and by the ability to apply material in a uniform distribution pattern to a prescribed surface area (swath) at a predetermined application rate. A conventional slide-on spreader is adequate for most airport applications of dry chemicals and sand. Special requirements may justify alternative or multi-purpose types of spreaders (e.g., a tailgate spreader coupled with a dump truck body).

Dry Material Hopper Capacity

This type of material spreader for sand and solid de/anti-icers uses a hopper type material spreader combined, as standard, with a liquid reservoir for pre-wetting sand with an approved liquid de/anti-icer. The determination of dry hopper capacity applies the application rate to the paved area to be covered. Assuming an application rate of 3.0 ounces per square yard, AC 150/5220-20A Figure 2-9 Hopper Capacity – Sand as shown in **FIGURE 6**, recommends a hopper size of 6 yards for PUB.

PUB currently has one material spreader, a 2006 International 7500 dump truck with 14-foot blade and sander truck. This vehicle is past its expected useful lifespan.

Recommendation for Sand Spreader: In combination with new plow truck purchases recommended previously, it is also recommended to include at least one solid materials hopper with 6-yard capacity and spreader to achieve a 75-foot swath of coverage to de-ice the runway in three passes.

FIGURE 6 Sand Spreader Hopper Capacity

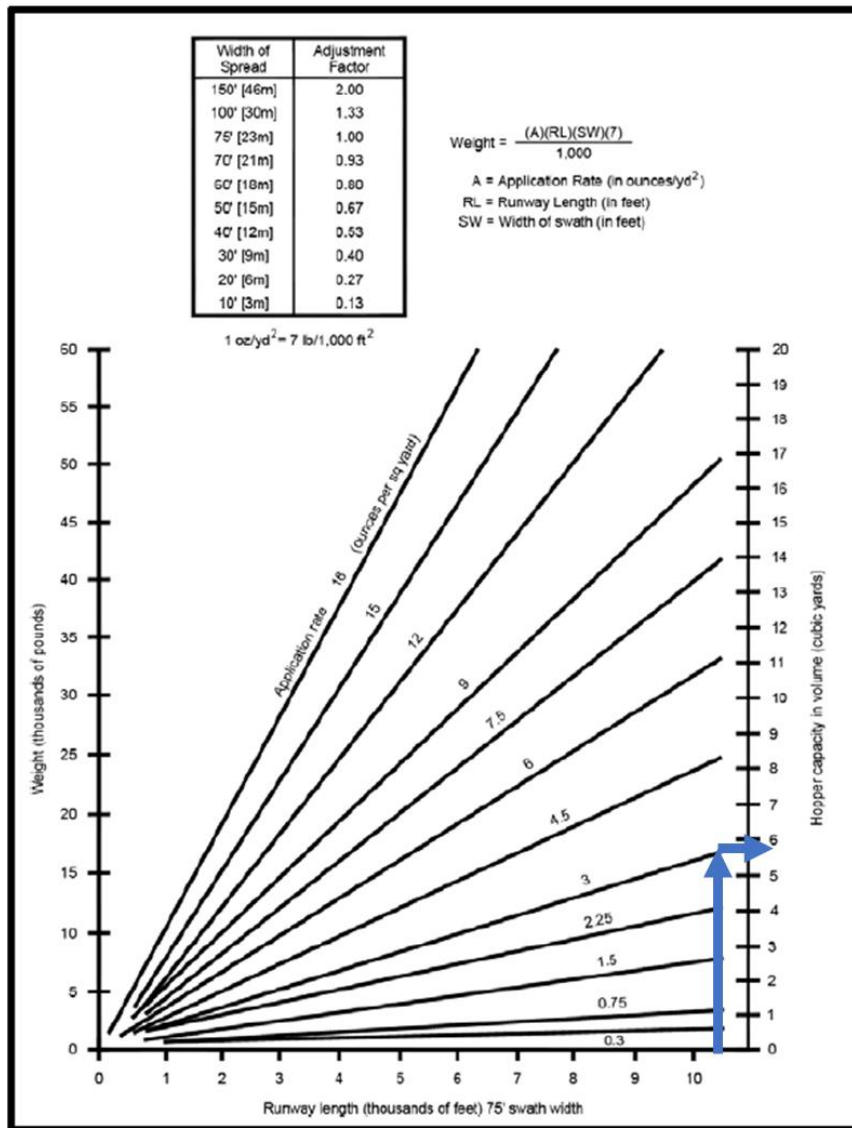


Figure 2-9. Hopper capacity – sand

SOURCE: FAA AC 150/5220-20A – Figure 2-9.

Runway Brooms

Runway brooms are primarily used in the high-speed sweeping and cleaning of snow, slush, ice, sand, and debris from movement and non-movement areas by using a brush. They incorporate high-speed brooms that consist of a number of brush sections, which may be front mounted to a carrier vehicle (conventional or dedicated), mounted underbody, or mounted on a trailer that is towed by a carrier vehicle. All can sweep wet slushy snow as well as fine dry snow from pavement surfaces.

Complementing a runway broom with an airblast system located behind the brush assembly helps in the sweeping process, dries the pavement surfaces, and can be used to clear snow from around runway lights.

Runway Broom Classification

The following two general classes constitute the family of runway brooms. Measure all swath widths when the broom is angled 30 degrees from the transverse position.

- **Small swath sweeper.** This class may be of any physical design having a demonstrated or manufacturer’s certified snow or slush removal and broadcasting ability sufficient to produce clear pavement within the swath width at the rated speed. The sweeper must have a minimum broom diameter of 36 inches and a swath width of not more than 12 feet.
- **Large swath sweeper.** This class may be of any physical design having a demonstrated or manufacturer’s certified snow or slush removal and broadcasting ability sufficient to produce clear pavement within the swath width at the rated speed. The sweeper must have a minimum broom diameter of 36 inches and a swath width greater than 12 feet.

The selection process follows the process described in SAE ARP 5564, Runway Brooms, paragraph 6.1 and Appendix A of the SAE ARP specification.

PUB is in not currently equipped with a broom sweeper truck.

Recommendation for Sweeper Truck: It is recommended that PUB be equipped with a large swath sweeper truck with a 25-foot-wide sweeper broom equipped with an airblast system.

SRE Vehicle Housing Determination

SRE are typically costly pieces of complex and technologically advanced equipment. To protect and service this equipment and protect local and federal investment, specifically designed maintenance and storage buildings are needed. SRE should be housed in a building capable of maintaining 50 degrees Fahrenheit to prolong the useful life of the equipment and to enable more rapid response to operational needs. Operationally, inspections should be conducted after each use to determine the necessity for

additional maintenance or repair. Guidance on storing SRE is provided in AC 150/5220-18, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials*.

AC 150/5220-18 uses airport size classification, based on the amount of paved runway area to be cleared, as one factor for facility planning purposes. The AC uses the following definitions of airport size. This definition considers the practice where an airport operator closes a smaller runway, such as a GA runway, to *focus its equipment fleet on the identified runway(s)*. In other words, airport size relates only to open runways. The total paved runway area in turn determines the size of the building. The values provided below exclude paved taxiways and aprons/gate areas. Landside operation areas do not contribute to the airport size definitions listed below.

- **Small Airport.** Airport having less than 420,000 square feet of total paved runway.
- **Medium Airport.** Airport having at least 420,000 but less than 700,000 square feet of total paved runway.
- **Large Airport.** Airport having at least 700,000 but less than 1,000,000 square feet of total paved runway.
- **Very Large Airport.** Airport having at least 1,000,000 square feet of total paved runway.

During snow events, PUB has plans to open one runway as Priority 1 surface, then clear the other runways as time permits. As presented earlier, PUB has a Priority 1 runway surface area of 1,574,700 square feet, making PUB a very large airport.

SRE building space refers to the total space allocation for three areas defined as follows:

- **Storage Area.** The term refers to designated areas leading to and including the parking areas for snow removal and friction measuring equipment, storing snow and ice control materials (e.g., de/anti-icers and heated sand), and equipment parts (e.g., bristles, neoprene blades, and brushes). Some items, such as chemicals and sand, could be stored in separate buildings.
- **Support Areas.** The term refers to administrative and equipment maintenance areas. Administrative areas include a supervisor's office, a mechanic's/clerk's office, separate or joint-use training and lunchroom, lockers, and lavatories. Equipment maintenance areas include repair bays, steam cleaning bays, and a welding area.
- **Special Equipment Areas.** The term refers to rooms or areas for heating, ventilation, and air conditioning (HVAC) equipment, steam generation, emergency power, and air compressor equipment as well as the machine room(s).

Planning for a SRE storage and maintenance facility should consider the following factors:

- Easy access to the runway and taxiway environment
- Building orientation

- Fueling facilities
- Building configuration accommodating all required personnel and equipment
- Design layout consisting of either a drive through, a center aisle, vehicle back-in, or modified (combination of layouts)
- Specific Features
 - General storage areas provided for oil, grease, tires, recycled oil, used oil and antifreeze, and equipment components such as bristles, sweeper wafers, plow blades, hitches, and spreader boxes.
 - Sheltered storage that prevents the deterioration or change in composition of sand and solid de/anti-icing chemicals, thereby retaining their handling properties and effectiveness. This storage can be either within the main building or a separate facility that offers a “conditioned” environment.
 - Welding area that, as preferred by airport operators, should be open and adjacent to a repair bay.
 - Wash and steam cleaning bay provided for the removal of accumulated dirt and chemical contamination to prevent deterioration and extend the life and proper function of SRE. Dirt and chemical contamination should be removed from equipment after storm events.

Additionally, all FAA regulations on building location must be followed, including:

- The height and configuration of the building must not constitute a hazard or obstruction to airspace criteria contained in AC 150/5300-13, Airport Design.
- The height and configuration of the building must not interfere with navigational and surveillance aids.
- The height and configuration of the building must not block airfield surveillance to any portion of any runway, taxiway, or terminal areas by the ARFF service and by the ATCT (direct line of sight).
- Chemical runoffs, such as by de/anti-icing chemicals, oils, fuel, and greases common to such buildings must be mitigated in accordance with federal or state Environmental Protection Agency (EPA) regulations for storm water discharges.
- All building construction or expansion on public-use airports requires an advance notice to the appropriate FAA regional Airports Division.
- For federally assisted airports, the building and associated support areas must be shown on the approved Airport Layout Plan (ALP).

Total Space Allocation

The total space allocation for a SRE facility is based on the sum of the individual areas determined necessary to meet three functionally defined purposes: (1) **Storage Areas**, (2) **Support Areas**, and (3) **Special Equipment Areas**. Space allocations for each of these areas are determined by values provided in tables in AC 150/5220-18A, equipment clearance values, or local building codes and ordinances. Since available SRE varies widely in widths and lengths, the concept of an Equipment Safety Zone (ESZ) surrounding the equipment is employed. **TABLE 2** provides ESZ clearance standards in accordance with equipment location and fixed or moving objects.

TABLE 2 Equipment Safety Zones

MINIMUM CLEARANCES FOR EQUIPMENT SAFETY ZONE (ESZ)				
Parked Equipment	5'	4'	10'	10'
Use the parked vehicle without attachments	When next to side walls or other stationary objects.	When rear of parked equipment faces a wall or other stationary objects.	Parallel to other parked equipment (parallel parking)	From door opening.
Moving Equipment	Between single drive through lane	Between dual drive-through lanes		
	15'	10'	14'	20'
Assumes a 7' carrier vehicle width with attachments at 30-degree perpendicular to vehicle body	From parked equipment that includes a front safe walk around zone of at least 3'	Small Plows 10' or less	Intermediate Plows and Small Sweepers Over 10' up to 15'	Large Plows and Sweepers Over 15' up to 22'

SOURCE: FAA AC 150/5220-18A Table 3-1.

Storage and Ice Control Materials

The space allocations for solid de/anti-icers and sand should be determined by the airport operator's operational requirements and historical usage amounts. It is recommended the final value represent sufficient material on hand to last several storm events (two to three events). Storage tanks for fluid de/anti-icers are recommended to hold at a minimum 120 percent of the amount of fluid used for a single storm (a "single" storm event may also represent several closely spaced storm events in a given week). **TABLE 3** provides a range for floor areas.

TABLE 3 Solid Materials Storage Space Allocation (Square Feet)

MATERIAL TYPE	RANGE
Sand Storage	150 - 500
Bagged or Bulk Solid Deicer	100 - 400
Salt Storage ¹	100 - 300

SOURCE: FAA AC 150/5220-18A Table 3-2.

NOTE: ¹*Salt is only for landside use.* Federal funding for salt storage areas is not allowed under the Airport Improvement Program or Passenger Facility Charge Program.

Support Areas

Support areas fall into two basic areas: (1) an area dedicated to administrative duties, an operational area or “snow desk,” employee areas, such as a kitchen, eating area, training/conference room, restrooms, and sleeping areas; and (2) an area dedicated to the maintenance and repair of equipment.

TABLE 4 provides typical space allocations for items that fall under the category of Support Areas.

TABLE 4 Support Area Space Allocation (Square Feet)

ITEMS UNDER SUPPORT AREA	AIRPORT SIZE		
	SMALL ¹	MEDIUM	LARGE/VERY LARGE
Snow Desk ³	100	144	200 - 400
Supervisor's Office ³	120	140	140
Mechanic's Office	100*	150	150
Administrative Area ³	200*	200	400
Training Room ³	300	400	400
Lunchroom ³	Combine with training room	300	600
Kitchen ³	Combine with training room	Combine with lunchroom	200
Rest Room/Lavatory for Men and Women (or local building code) ³	300	500	700
Lockers ³	Combine with rest rooms	500	700
Sleeping Quarters ² Bunk area per person	56	56	56
Parts Area (snow removal operation)	600*	800	1000
Parts Area (snow removal vehicles)	200	300	400
Lubrication, Oil, Grease Storage	100-150	150 - 200	150 - 200
Welding Area	200*	200	400
Recycled Oil and Used Anti-freeze	150	200	200
Mechanic's Bench Area (along walls)	100	200	400
Repair Bay – number and square footage per bay	1* 600	1 1,000	2 1,000
Cleaning Bay	600*	1,000	1,000
Emergency First Aid Room ³	Combine with lunchroom	Combine with training room	75

SOURCE: FAA AC 150/5220-18A.

NOTES: ¹ Airports with less than 225,000 square feet of total paved runway will not necessarily need items marked with an asterisk (*).

² Certain airport operators may deem it necessary to have sleeping quarters.

³ Small airports may have a separate building that houses and services equipment and chemicals, while another building, such as the terminal, houses administrative functions and crew facilities.

Special Equipment Area

TABLE 5 shows typical space allocations for items that fall under the category of Special Equipment Area. Local building and ordinances may require larger areas than stated in **TABLE 6**. In such cases, local building and ordinances must be followed.

TABLE 5 Special Equipment Areas (Square Feet)

ITEMS UNDER SPECIAL EQUIPMENT AREA	RANGE
HVAC Area	300 - 800
Recycled Oil and Used Anti-freeze	150 - 300
Emergency Power Generation	100 - 300
Hydraulic Lift, Vacuum Pumps, and Air Compressor	100 - 200
Steam Generation	100 - 150
Major/Large Power Tools	100 - 200
Overhead Crane	One per building with very large-airports having two

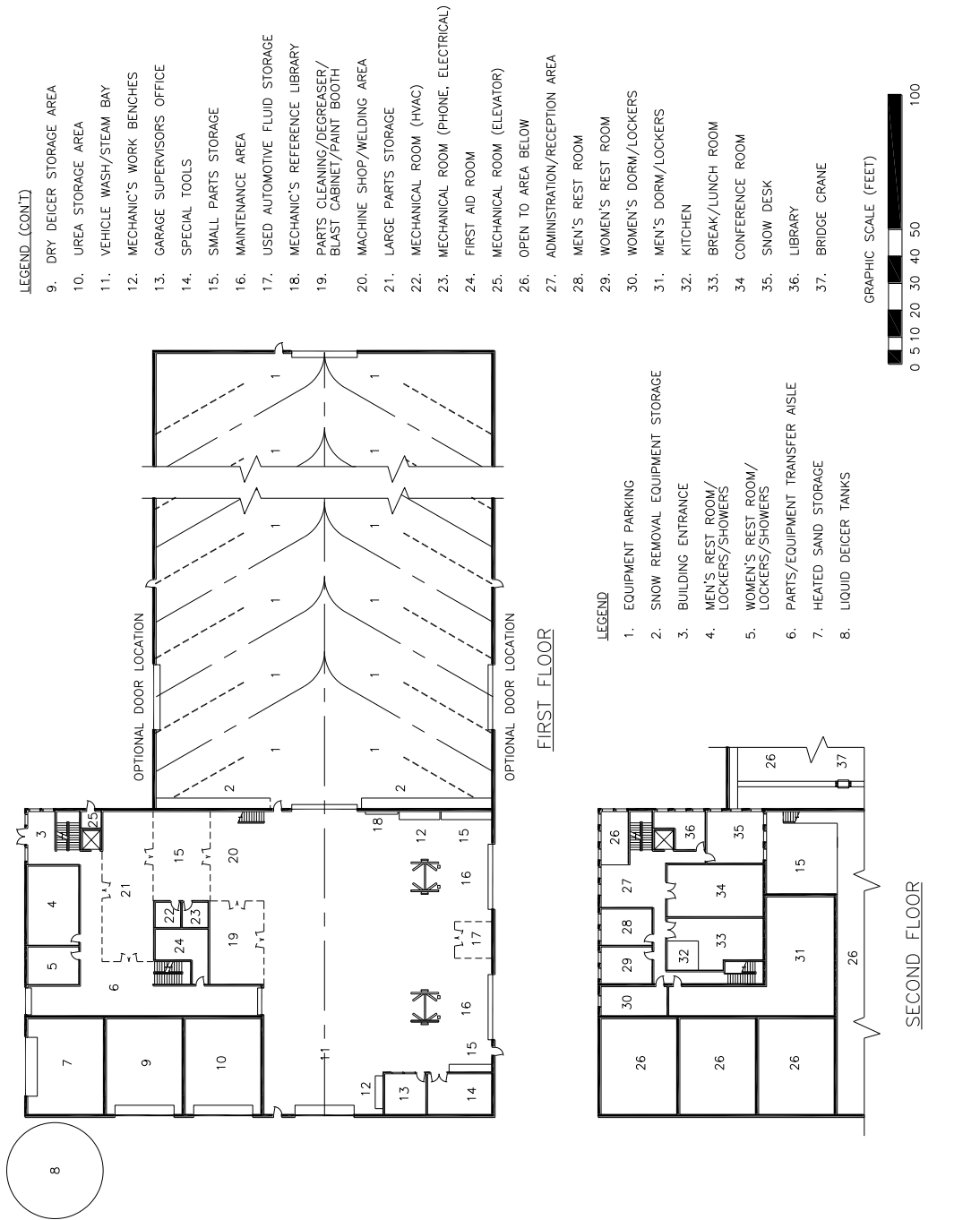
SOURCE: FAA AC 150/5220-18A.

SRE Storage and Maintenance Facility Recommendations:

PUB has an existing SRE and Maintenance facility consisting of approximately 15,800 square feet. The space is limited so that equipment attachments and materials are currently stored outside. Using the guidance contained in AC 150/5220-18A, a total SRE storage and maintenance facility consisting of approximately 20,000 square feet is required. The existing facility is limited in providing adequate space to accommodate the larger recommended SRE.

When considering an expansion or replacement of the existing facility to accommodate newly acquired replacement vehicles, consultation with a specialized engineering and architectural firm to design the facility within AC 150/5220-18A design and construction standards is recommended. **FIGURE 7** illustrates a typical SRE equipment maintenance and materials storage facility. SRE and maintenance facilities should also be located to provide direct access to the aprons and taxiway system for efficient response to snow events.

FIGURE 7 Typical Large to Very Large Airport Fleet Facility



SOURCE FAA AC 150/5220-18A Figure 3-3.