Plumbing Inspection

- Welcome
- My name is Kara Topper. I work for DLI as a plumbing Code Rep for SE Minnesota.
- I maintain my State Master Plumbing License, City of Minneapolis Comp card, Limited Building Official certification, and Backflow Rebuilder.
- I’ve been a plumber for 29 years.

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Plumbing Inspection

- Welcome
- My name is Steve Nuebel. I work for DLI as a Plumbing Code Rep for East Central MN.
- I maintain my State Master Plumbing License, Building Official Certificate, and Backflow Rebuilder.
- I've been plumbing since 1990.

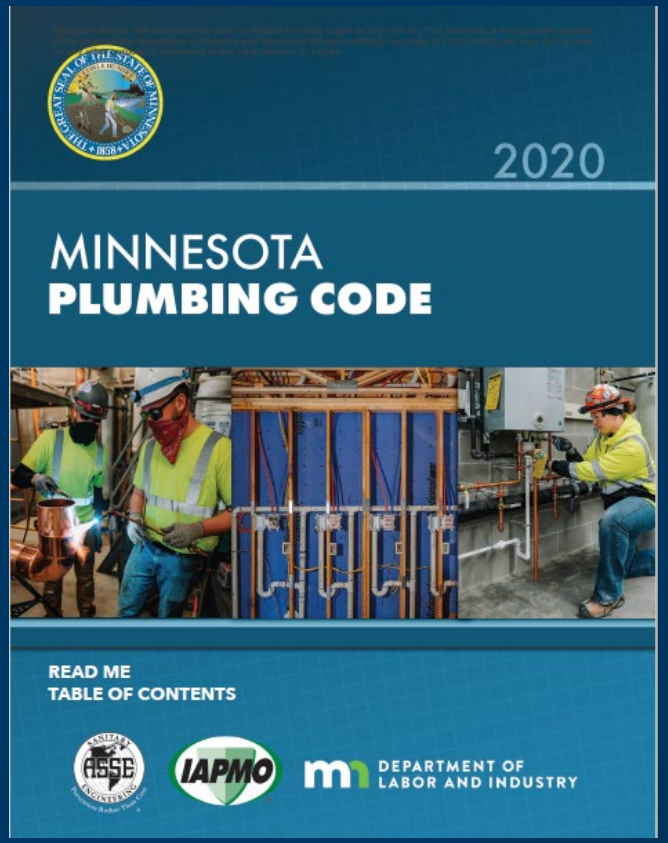
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Plumbing Inspection

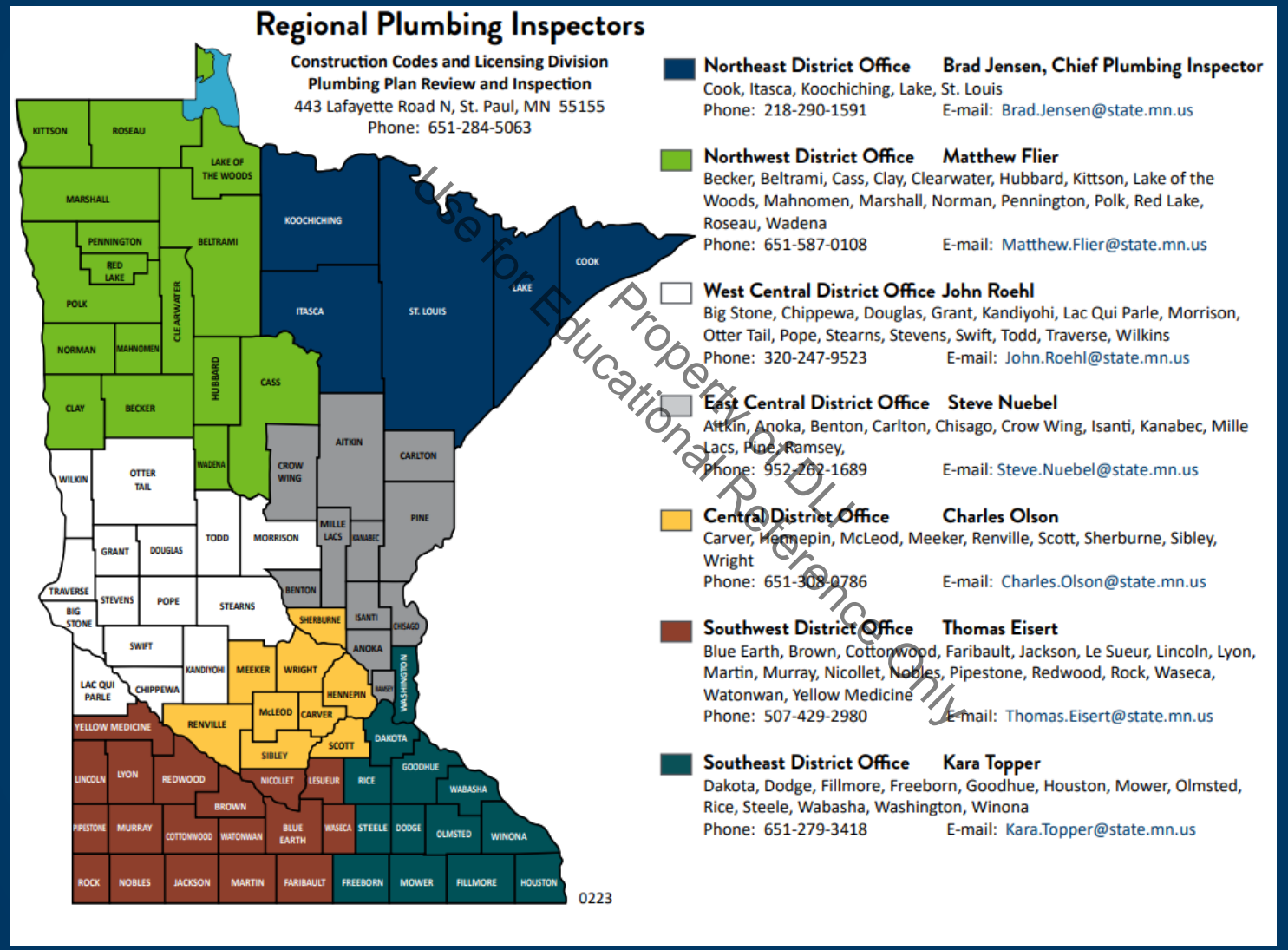
2020 Minnesota Plumbing Code, Chapter 4714

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- **EFFETIVE DATE**
  - The new amendments to the Minnesota Plumbing Code, Chapter 4714, became in effect on Dec. 17th, 2021.



Minnesota Department of Labor and Industry



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Plumbing Inspection

- Plumbing Underground Inspection (outside and inside the building)
- Aboveground/Inwall Inspection
- Final Inspection

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Plumbing Inspection

What happens before you are conducting a plumbing Inspection:

- Plumbing plan review done at DLI (Unless your town has plan review delegation) 1300.0215 States Plumbing Contractor/Master plumber is responsible to submit plans before any plumbing begins.
- Permit must be obtained
- Inspections can proceed

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Inspector Educational Reference Only

Plumbing Inspection

- Who is the person you are meeting for Inspection?
- Does he or she have the correct license?
- Yes, you should check for plumbing license?
- Should you be checking water conditioning contractors and installers for their licenses? YES 1416.0092 (required in all cities) They can NOT install water heaters.

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Underground Plumbing Inspection

- Ensure correct plumbing materials are being used
- Ensuring correct fittings are being used.
- Installed on good soil (not sharp rocks)
- All piping going through cement needs to be wrapped/sleeved.
- Holds an air test
- Ensure building sewer and water service are inspected and tested.

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Plumbing Inspection

Definitions 218

Plumbing System

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- Includes all potable water, building supply, and distribution pipes; all plumbing fixtures and traps; all drainage and vent pipes; all building drains and building sewers, including their respective joints and connections, devices, receptors, and appurtenances **within the property limits.**

Plumbing Inspection

4714.311.1:

- Every building shall have its own independent water and sewer connection.

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Plumbing Inspection

- Are Correct Materials being used (701.2)

TABLE 701.2
MATERIALS FOR DRAIN, WASTE, VENT PIPE AND FITTINGS

MATERIAL	UNDERGROUND DRAIN, WASTE, VENT PIPE AND FITTINGS	ABOVEGROUND DRAIN, WASTE, VENT PIPE AND FITTINGS	BUILDING SEWER PIPE AND FITTINGS	REFERENCED STANDARD(S) PIPE	REFERENCED STANDARD(S) FITTINGS
ABS (Schedule 40)	X	X	X	ASTM D2661, ASTM D2680*	ASTM D2661, ASTM D2680*
Cast-Iron	X	X	X	ASTM A74, ASTM A888, CISPI 301	ASME B16.12, ASTM A74, ASTM A888, CISPI 301
Co-Extruded ABS (Schedule 40)	X	X	X	ASTM F628	ASTM D2661, ASTM D2680*
Co-Extruded Composite (Schedule 40)	X	X	X	ASTM F1488	ASTM D2661, ASTM D2665, ASTM F794*, ASTM F1866
Co-Extruded PVC (Schedule 40)	X	X	X	ASTM F891, ASTM F1760	ASTM D2665, ASTM F794*, ASTM F1336*, ASTM F1866
Copper and Copper Alloys (Type DWV)	X	X	X	ASTM B43, ASTM B75, ASTM B251, ASTM B302, ASTM B306	ASME B16.23, ASME B16.29
Galvanized Malleable Iron	—	X	—	—	ASME B16.3
Galvanized Steel	—	X	—	ASTM A53	—
Polyethylene	—	—	X	ASTM F714, ASTM F894	—
PVC (Schedule 40)	X	X	X	ASTM D1785, ASTM D2665, ASTM F794*	ASTM D2665, ASTM F794*, ASTM F1866
PVC (Sewer and Drain)	—	—	X	ASTM D2729	ASTM D2729
PVC PSM	—	—	X	ASTM D3034	ASTM D3034
Stainless Steel 304	—	X	—	ASME A112.3.1	ASME A112.3.1
Stainless Steel 316L	X	X	X	ASME A112.3.1	ASME A112.3.1
Vitrified Clay (Extra strength)	—	—	X	ASTM C700	ASTM C700

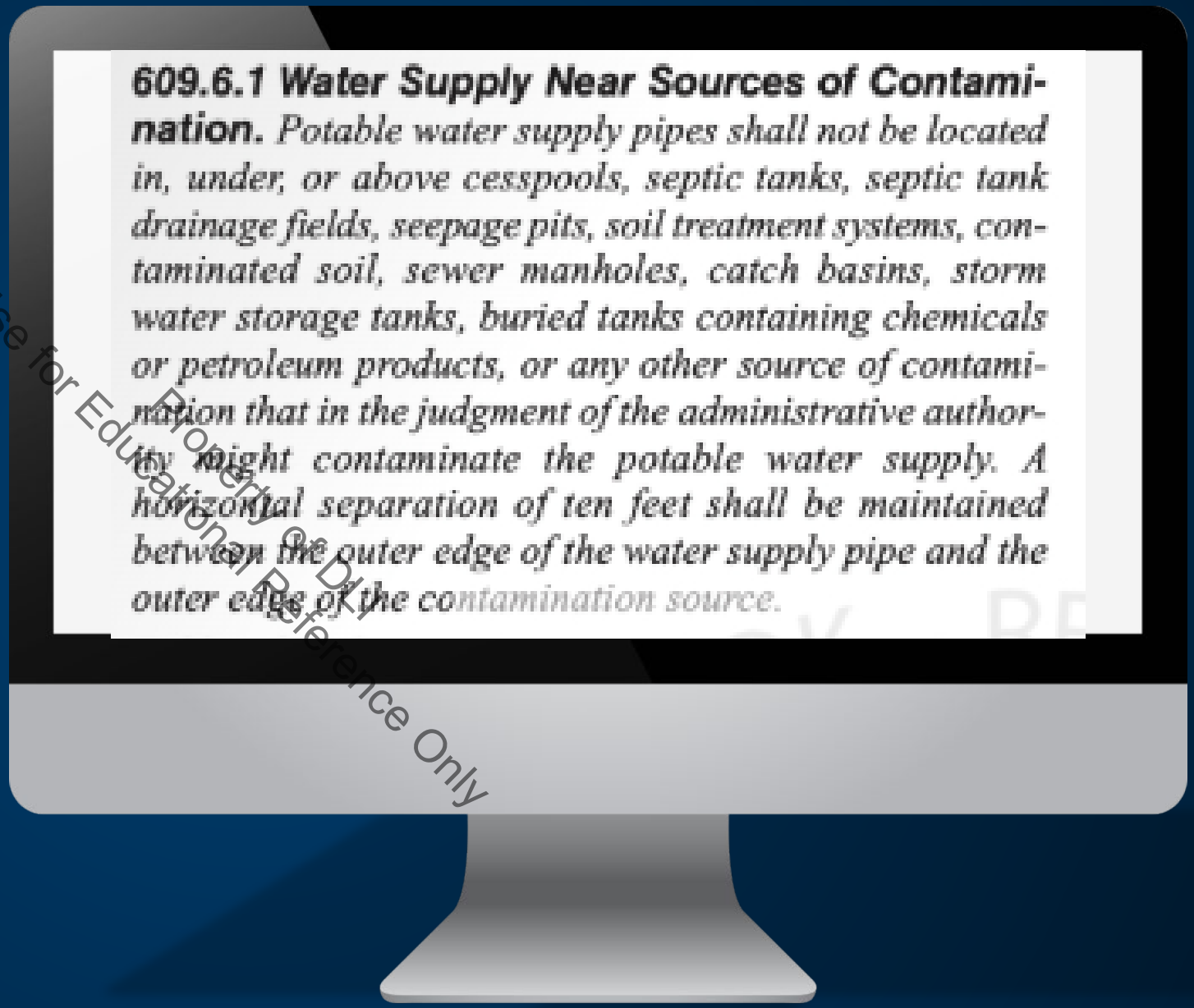
* For building sewer applications.

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IAPMO
www.iapmo.org

Plumbing Inspection



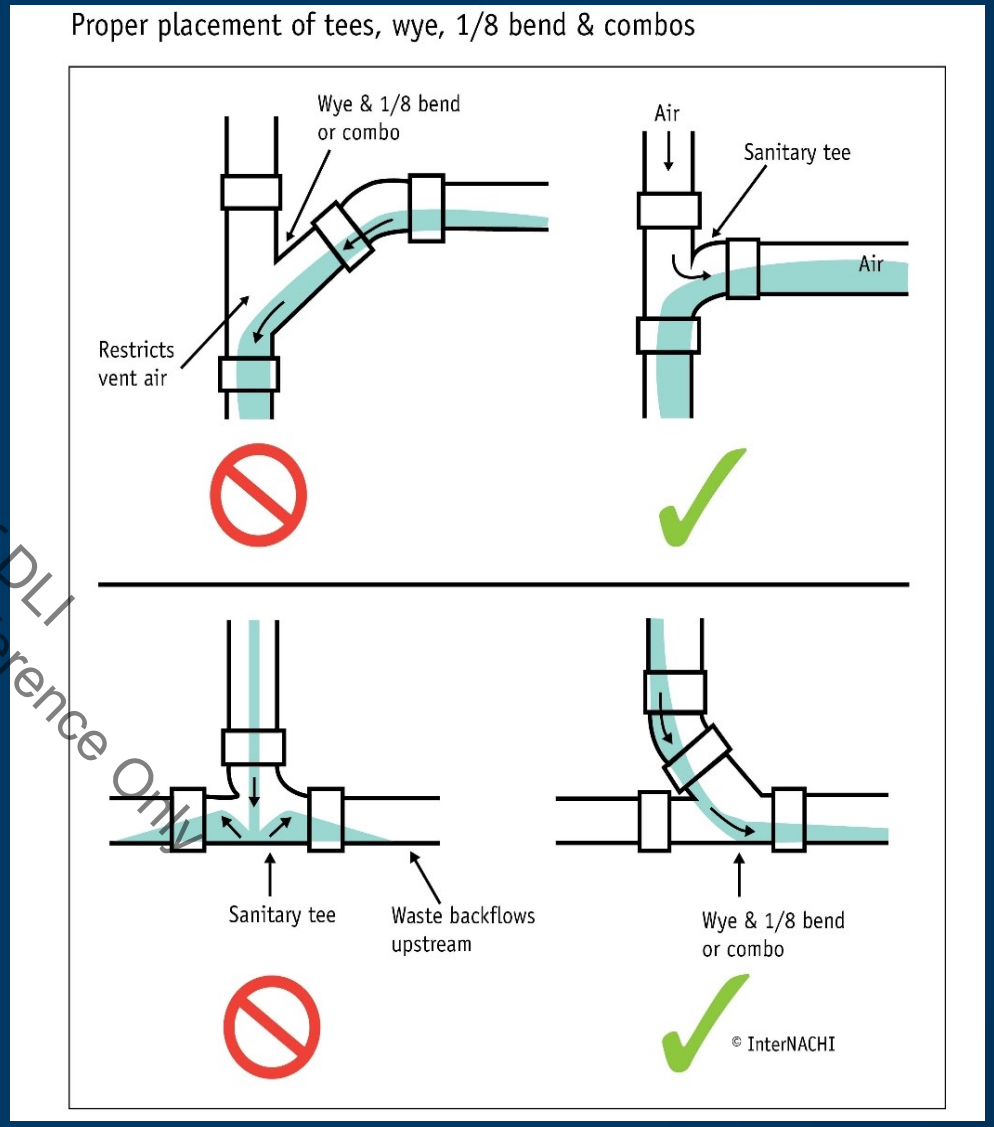
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Plumbing Inspection

- Are the correct fittings being used underground or aboveground?

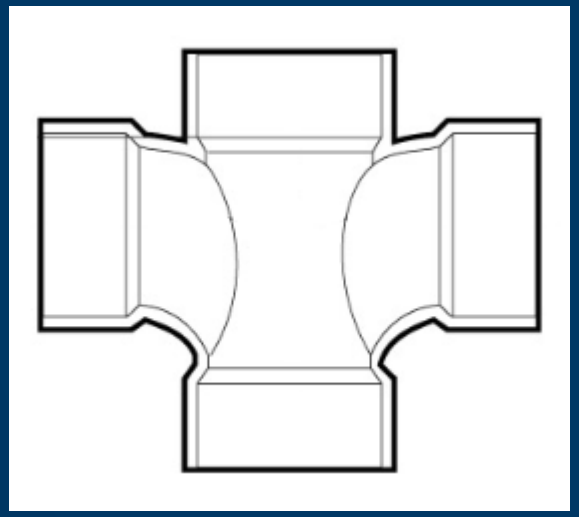


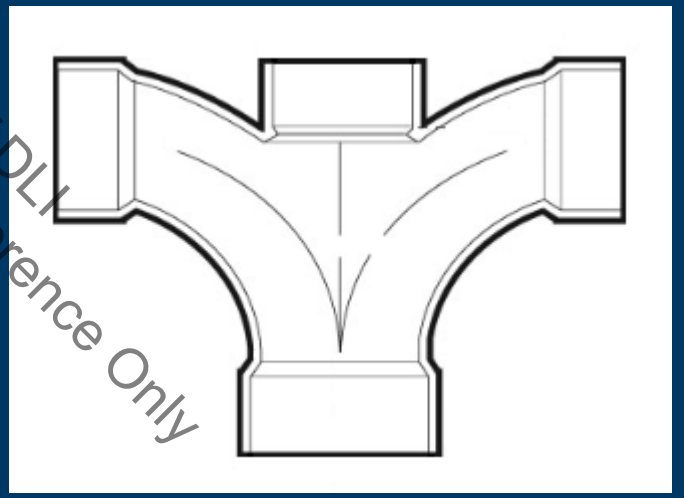
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2020 Minnesota Plumbing Code, Chapter 4714

- **Fixture Fitting.**
  - A device that controls and guides the flow of water.

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CORRECT FITTING

Plumbing Inspection



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Plumbing Inspection





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Residential Plumbing Inspection



Saddles shall not be used as drainage fittings. 4714.310.1

Plumbing Inspection



Plumbing Inspection

- 312.0 Protection of Piping, Materials, and Structures
- 312.3 Building Sewer and Drainage Piping. No building sewer or other drainage piping or part thereof, constructed of materials other than those approved for use under or within a building, shall be installed under or within 2 feet of a building or structure, or <1 foot of the surface of the ground



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Property of DLI



Plumbing Inspection

- 313.5 Underground Piping

- Piping in the ground shall be laid on a firm bed for its entire length; where other support is otherwise provided; it shall be approved in accordance with Section 301.2.

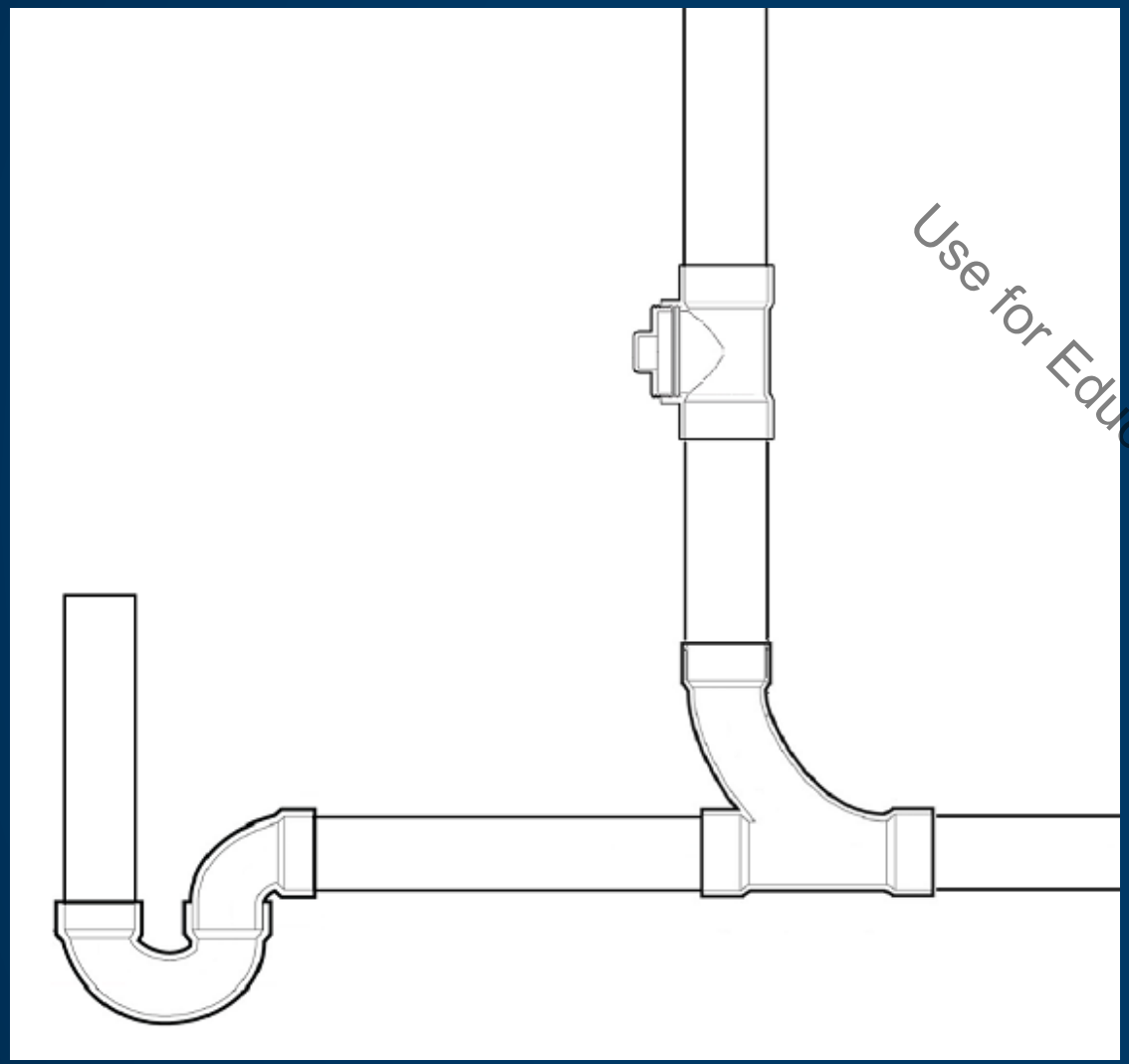
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Plumbing Inspection

Rocks on top of the piping, improper backfill material. Does not meet requirements of ASTM D2321



Plumbing Inspection

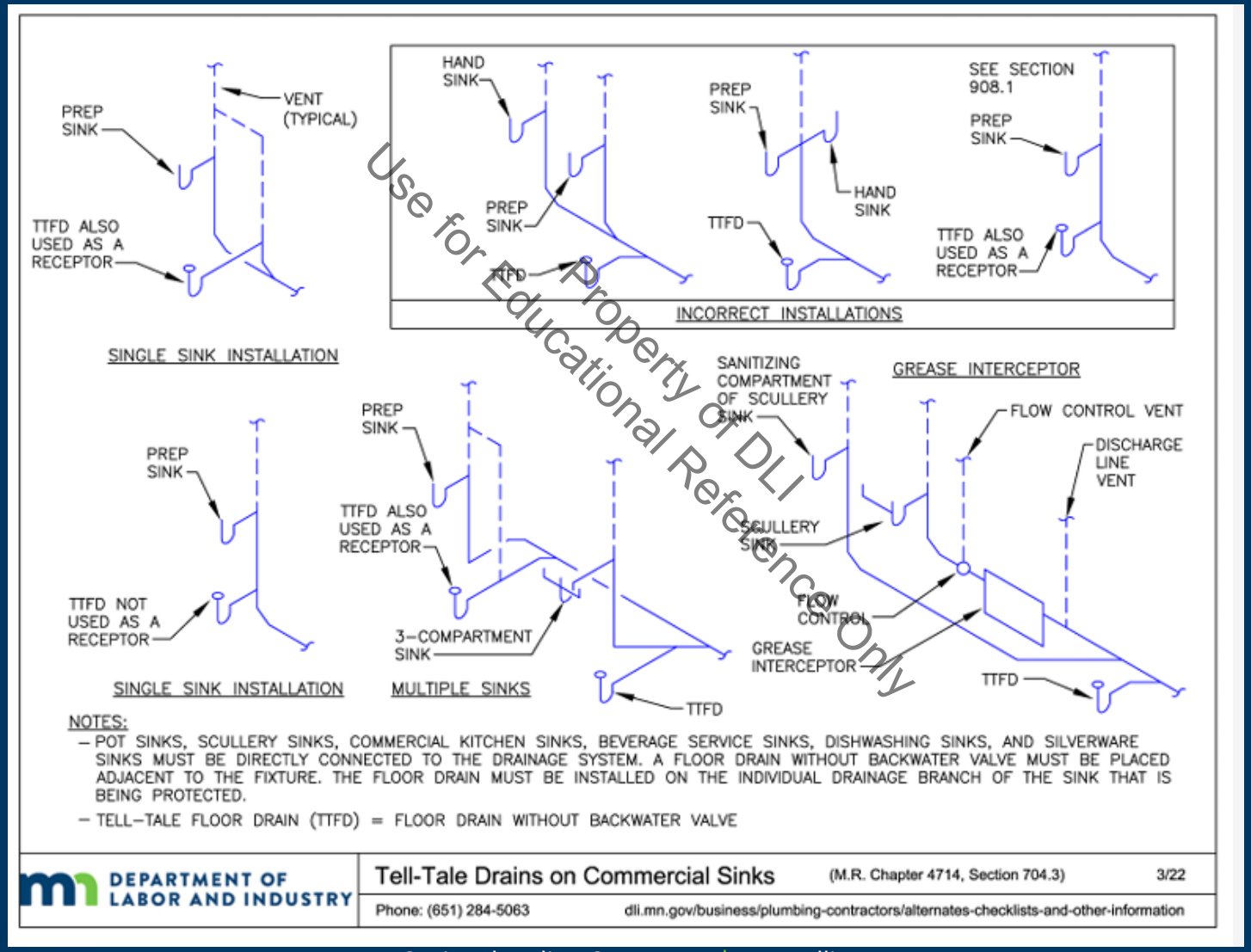


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4714.418.3 Floor Drains -

- Shall be installed in toilet rooms with 2 or more water closets or a combo of 1 water closet and 1 urinal.
- Shall be installed in laundry rooms in commercial buildings.

Plumbing Inspection



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Plumbing Inspection

312.10 Sleeves. Sleeves shall be provided to protect piping through concrete and masonry walls, and concrete floors.

Property of DLI
Use for Educational Reference Only



Plumbing Inspection

707.0 Cleanouts.

707.1 Plug. Each cleanout fitting for cast-iron pipe shall consist of a cast-iron or copper alloy body and an approved plug. Each cleanout for galvanized wrought iron, galvanized steel, copper, or copper alloy pipe shall consist of a plug as specified in Table 707.1, or a standard weight copper alloy cap, or an approved ABS or PVC plastic plug, or an approved stainless-steel cleanout or plug. Plugs shall have raised square heads or approved countersunk rectangular slots.

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Property of FEI

707.4 Location.

Each horizontal drainage pipe shall be provided with a cleanout at its upper terminal and each run of piping that is more than 100 feet (30 480 mm) in total developed length shall be provided with a cleanout for each 100 feet (30 480 mm), or fraction thereof, in length of such piping. An additional cleanout shall be provided in a drainage line for each aggregate horizontal change in direction exceeding 135 degrees (2.36 rad). A cleanout shall be installed above the fixture connection fitting, serving each urinal, regardless of the location of the urinal in the building.

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Plumbing Inspection

Exceptions:

(1) Cleanouts shall be permitted to be omitted on a horizontal drain line less than 5 feet (1524 mm) in length unless such line is serving sinks or urinals.

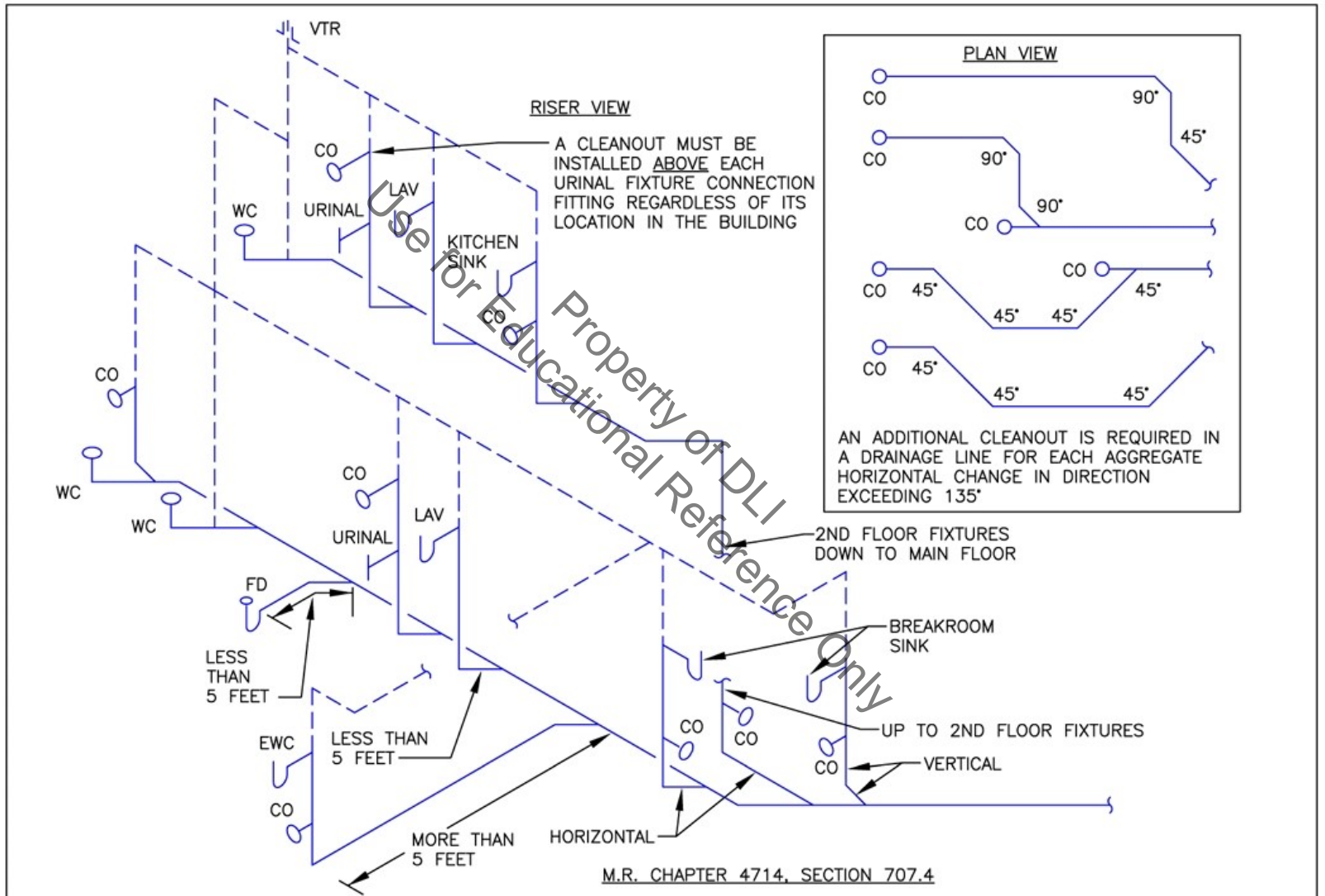
(2) Cleanouts shall be permitted to be omitted on a horizontal drainage pipe installed on a slope of 72 degrees (1.26 rad) or less from the vertical angle (one-fifth bend).

(3) Excepting the building drain, its horizontal branches, kitchen sinks, and urinals, a cleanout shall not be required on a pipe or piping that is above the floor level of the lowest floor of the building.

(4) An approved type of two-way cleanout fitting, installed inside the building wall near the connection between the building drain and the building sewer or installed outside of a building at the lower end of a building drain and extended to grade, shall be permitted to be substituted for an upper terminal cleanout.

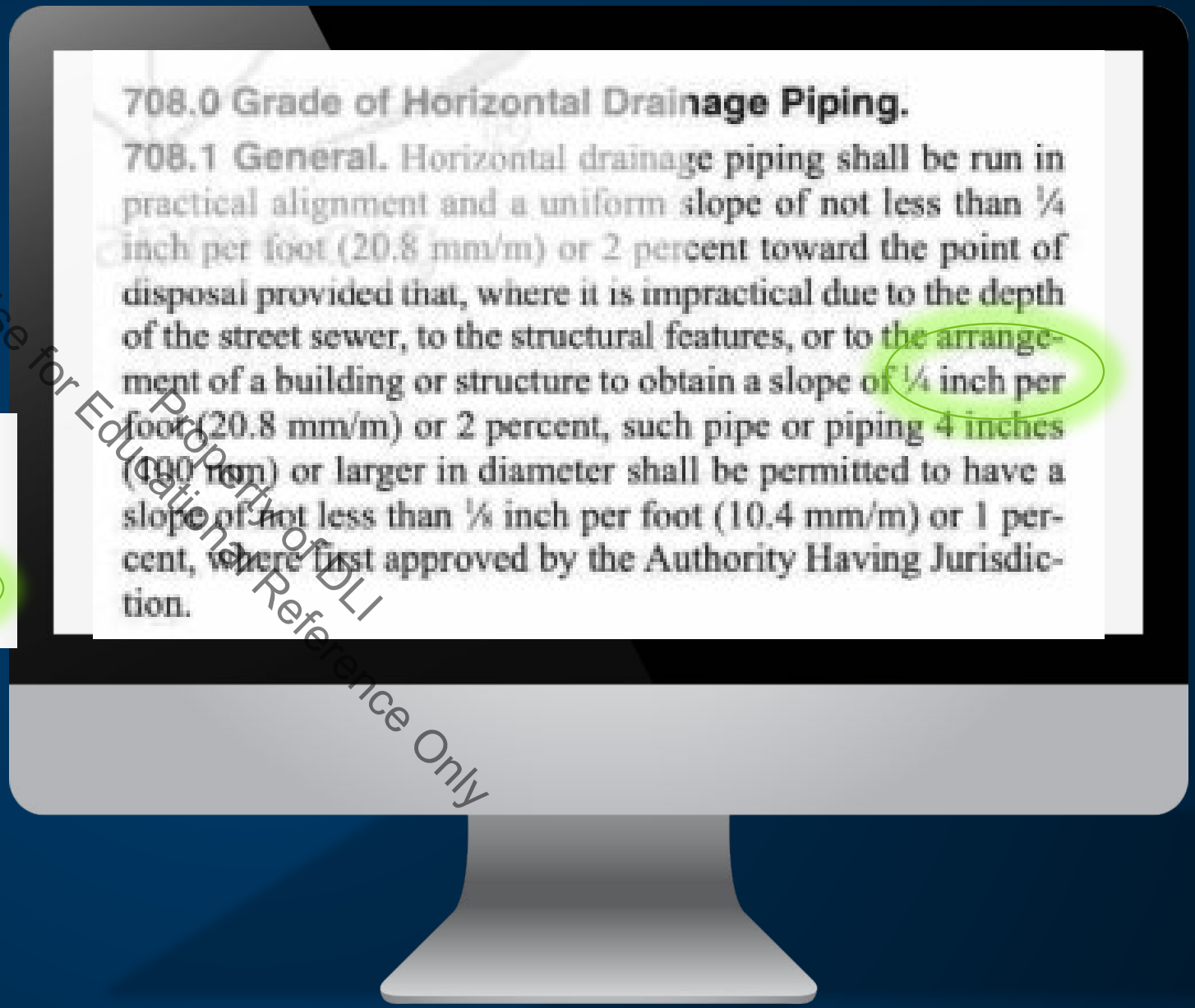
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Plumbing Inspection

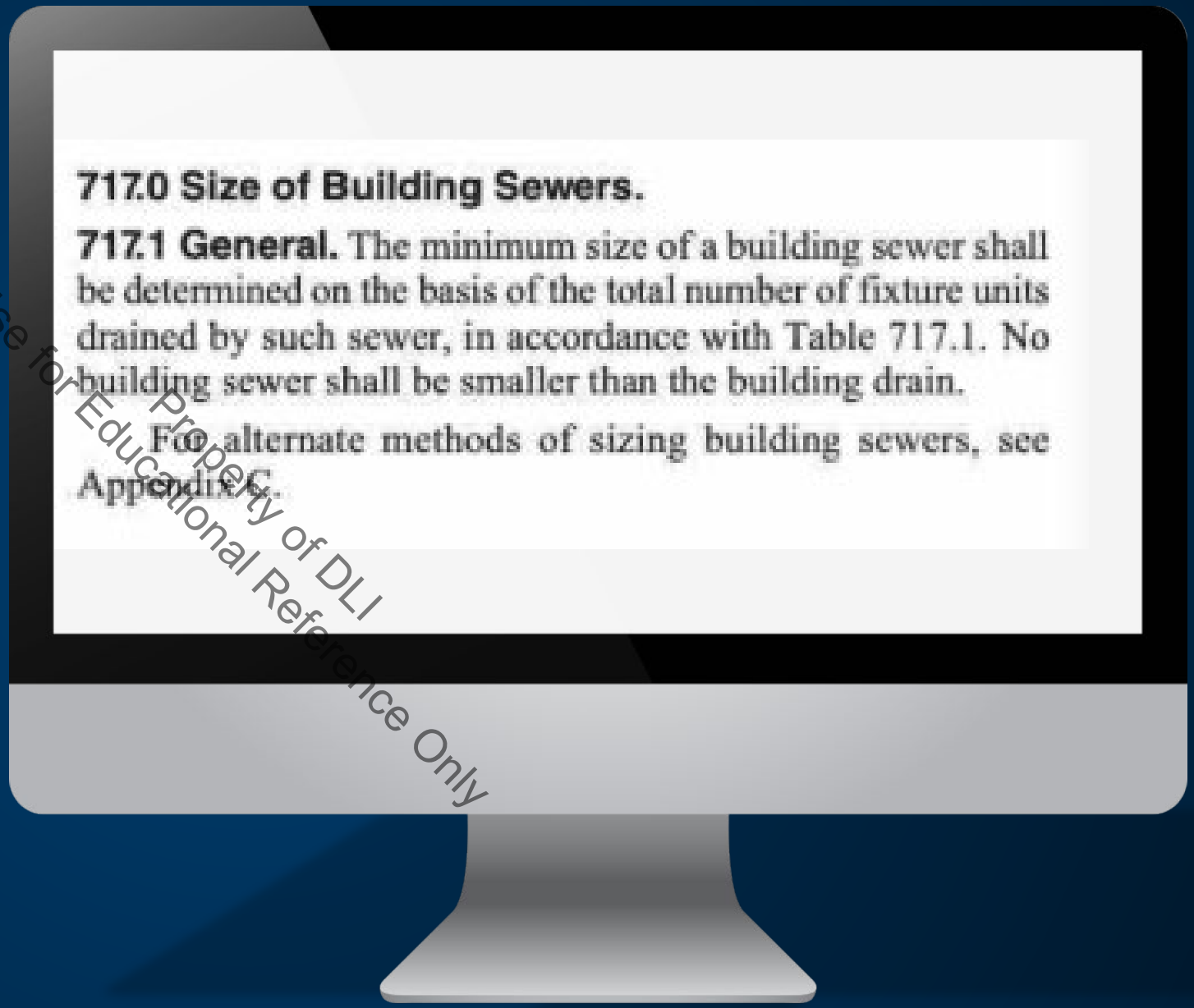


718.0 Grade, Support, and Protection of Building Sewers.

718.1 Slope. Building sewers shall be run in practical alignment and at a uniform slope of not less than ¼ inch per foot (20.8 mm/m) toward the point of disposal.



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Aboveground Plumbing:

- Shower pan inspections
- Aggerate Cross sectional
- Spill line for venting

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Plumbing Inspection

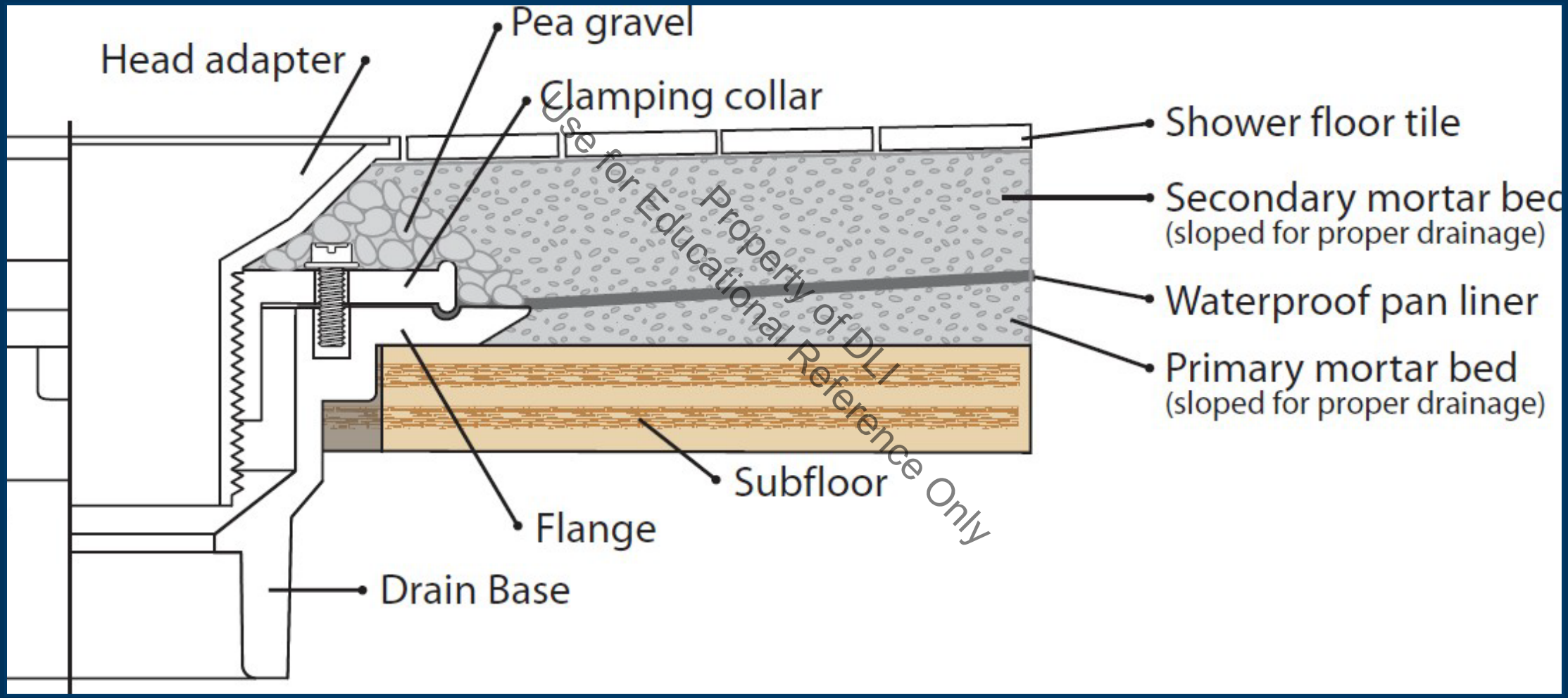
- Chapter 4 – 408.0 Showers



- Shower shall have a waste outlet and fixture tailpiece not less than 2 inches.
- Shower compartment, regardless of shape, shall have a minimum finished interior of 1024 square inches and shall be capable of encompassing a 30-inch circle.
- Shower receptor built on-site shall be tested for watertightness by filling with water.
- Showerhead shall be located so that they do not discharge directly at the entrance.

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Plumbing Inspection



Plumbing Inspection



408.7 Lining for Showers and Receptors. Shower receptors built on-site shall be watertight and shall be constructed from approved-type dense, nonabsorbent, and noncorrosive materials. Each such receptor shall be adequately reinforced, shall be provided with an approved flanged floor drain designed to make a watertight joint on the floor, and shall have smooth, impervious, and durable surfaces. *Unless the shower receptor is poured on the ground as part of a slab, an approved shower liner must be provided in accordance with the requirements of this section.*

Shower receptors shall have the subfloor and rough side of walls to a height of not less than 3 inches (76 mm) above the top of the finished dam or threshold shall be first lined with sheet plastic, lead, or copper, or shall be lined with other durable and watertight materials. Showers that are provided with a built-in place permanent seat or seating area that is located within the shower enclosure, shall be first lined with sheet plastic, lead, copper, or shall be lined with other durable and watertight materials that extend not less than 3 inches (76 mm) above horizontal surfaces of the seat or the seating area.

Lining materials shall be pitched ¼ inch per foot (20.8 mm/m) to weep holes in the subdrain of a smooth and solidly formed subbase. Such lining materials shall extend upward on the rough jambs of the shower opening to a point not less than 3 inches (76 mm) above the horizontal surfaces of the seat or the seating area, the top of the finished dam or threshold and shall extend outward over the top of the permanent seat, permanent seating area, or rough threshold and be turned over and fastened on the outside face of both the permanent seat, permanent seating area, or rough threshold and the jambs.

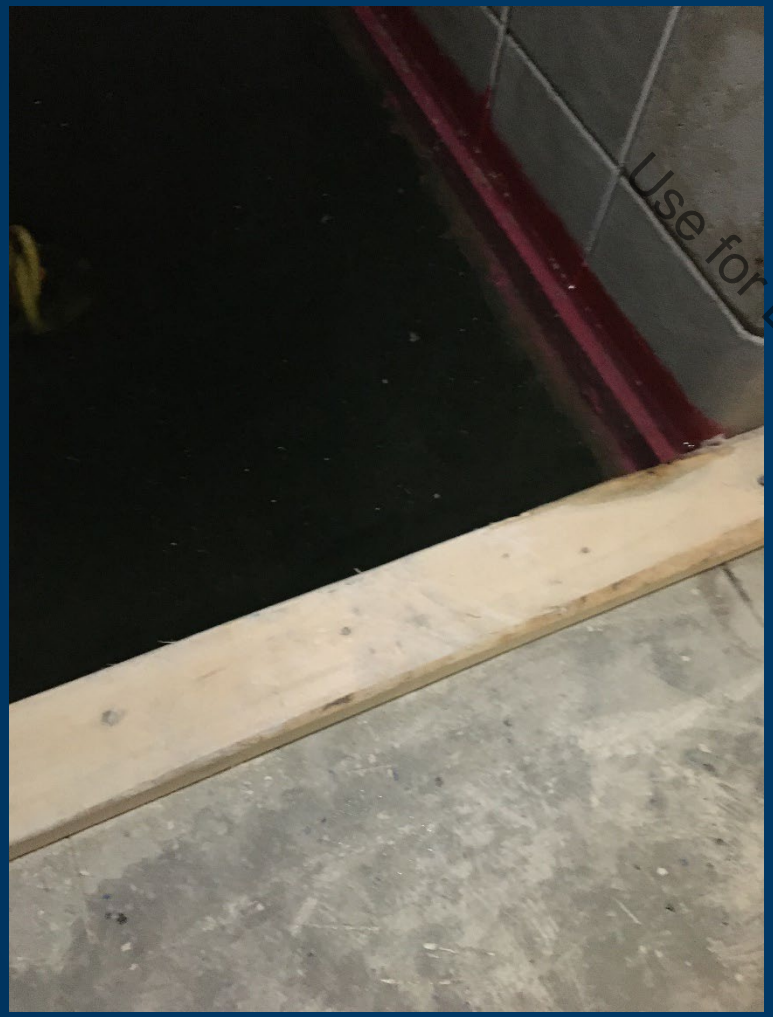
Nonmetallic shower subpans or linings shall be permitted to be built up on the job site of not less than three layers of standard grade 15 pound (6.8 kg) asphalt impregnated roofing felt. The bottom layer shall be fitted to the formed subbase and each succeeding layer thoroughly hot-mopped to that below. Corners shall be carefully fitted and shall be made strong and watertight by folding or lapping, and each corner shall be reinforced with suitable webbing hot-mopped in place.

Folds, laps, and reinforcing webbing shall extend not less than 4 inches (102 mm) in all directions from the corner, and webbing shall be of approved type and mesh, producing a tensile strength of not less than 50 pounds per square foot (lb/ft^2) (244 kg/m^2) in either direction. Nonmetallic shower subpans or linings shall be permitted to consist of multilayers of other approved equivalent materials suitably reinforced and carefully fitted in place on the job site as elsewhere required in this section.

Linings shall be properly recessed and fastened to the approved backing so as not to occupy the space required for the wall covering, and shall not be nailed or perforated at a point that is less than 1 inch (25.4 mm) above the finished dam or threshold. An approved type subdrain shall be installed with a shower subpan or lining. Each such subdrain shall be of the type that sets flush with the subbase and shall be equipped with a clamping ring or other device to make a tight connection between the lining and the drain. The subdrain shall have weep holes into the waste line. The weep holes located in the subdrain clamping ring shall be protected from clogging.

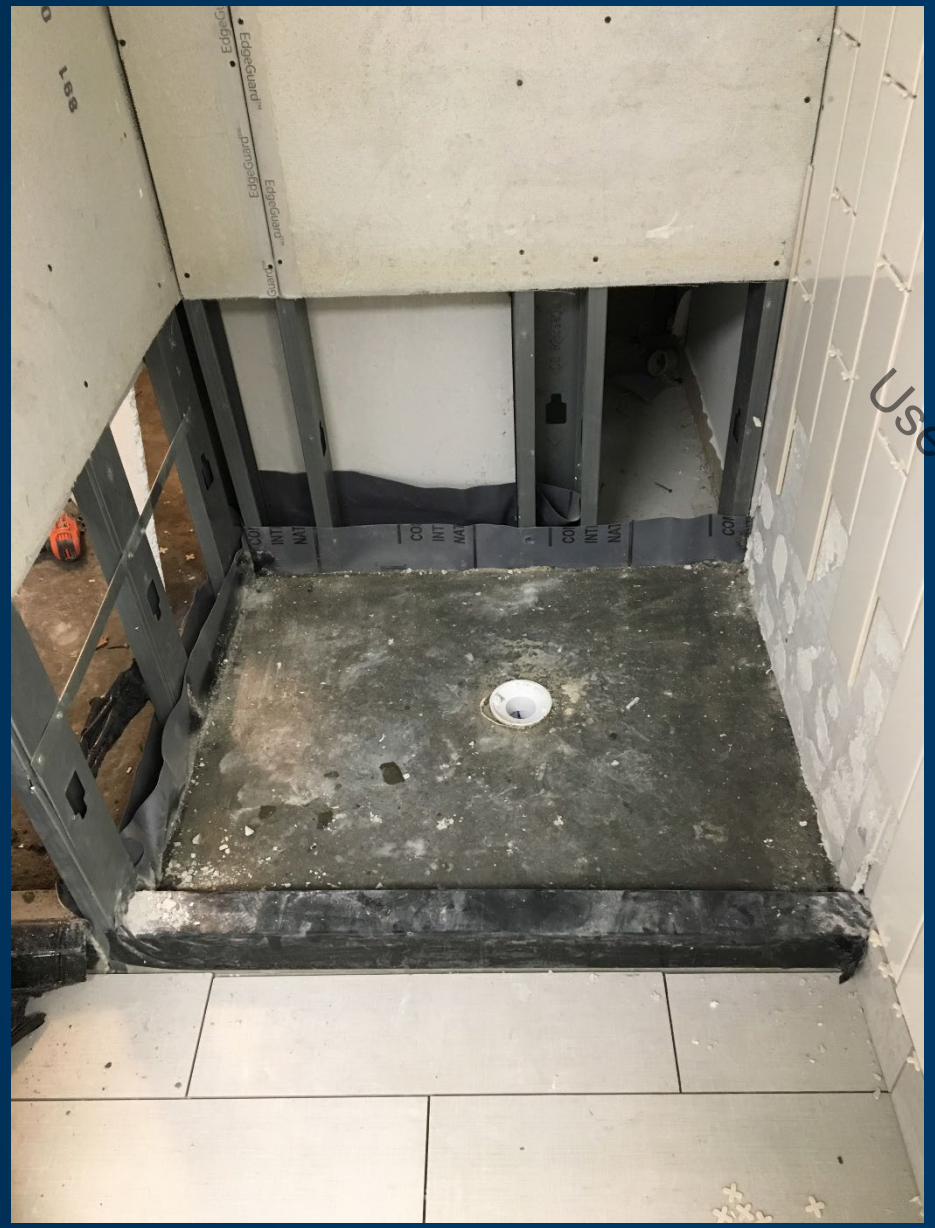
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Plumbing Inspection





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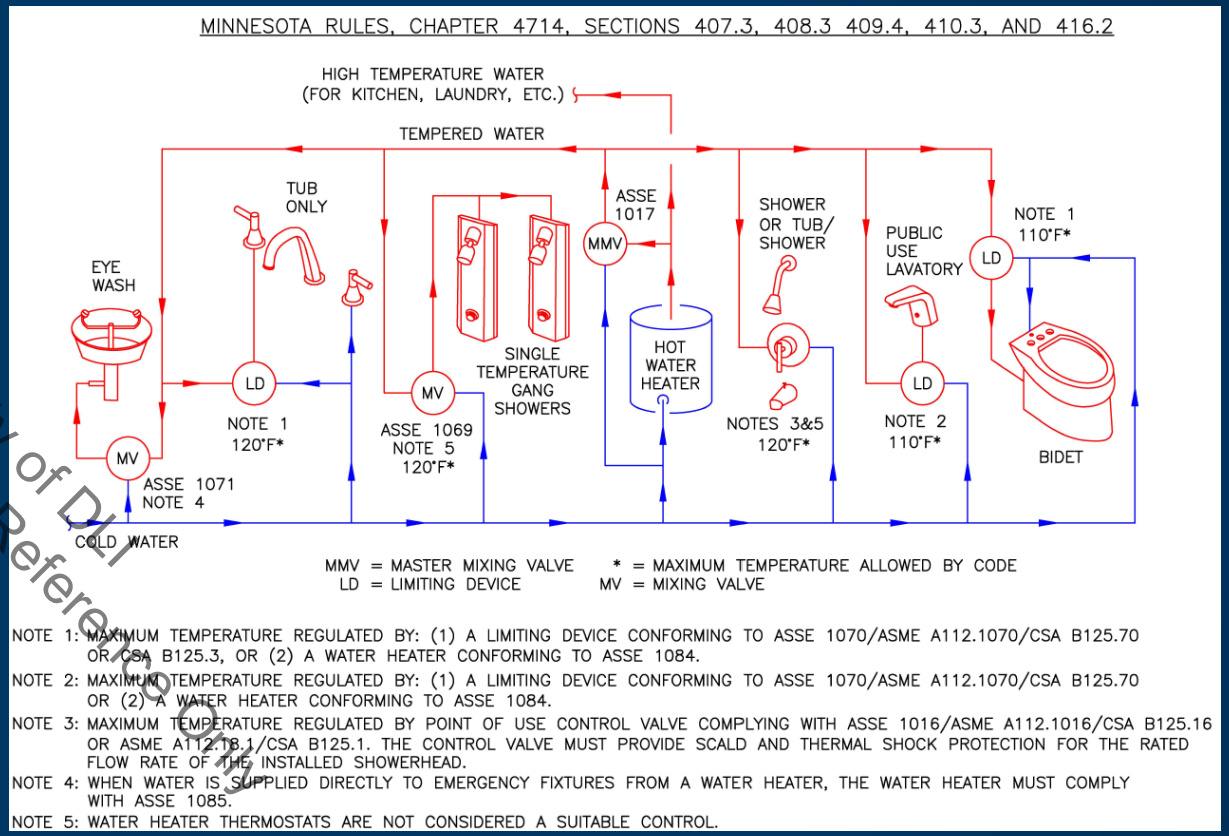
What is wrong with this photo??

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Plumbing Inspection

4714.409 and 4714.417.5

- Bathtubs and whirlpool bathtubs shall be provided with a waste outlet and tailpiece not less than one and a half inches.
- Maximum hat water temperature discharging from bathtub or whirlpool filler shall meet ASSE 1070.
- When having two separate handles to control hot and cold. Left-hand control of the faucet controls the hot water when facing it.



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Plumbing Inspection

712.3 Air Test.

The air test shall be made by attaching an air compressor testing apparatus to a suitable opening and, after closing all other inlets and outlets to the system, forcing air into the system until there is a uniform gauge pressure of 5 pounds-force per square inch (psi) (34 kPa) or sufficient to balance a column of mercury 10 inches (34 kPa) in height. The pressure shall be held without the introduction of additional air for a period of not less than 15 minutes.

712.4 Negative Test.

Concrete manholes and sewer lines shall be tested by negative pressure in accordance with ASTM Standards C1214-19 and C1244-17 or the Hydrostatic Test Method in section 1107.2.3(B).

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704.2





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Plumbing Inspection



908.2 Horizontal Wet Venting for a Bathroom Group.

A bathroom group located on the same floor level shall be permitted to be vented by a horizontal wet vent where all of the conditions of Section 908.2.1 through Section 908.2.5 are met.

908.2.1 Vent Connection.

The dry vent connection to the wet vent shall be an individual vent for the bidet, shower, or bathtub. One or two vented lavatory(s) shall be permitted to serve as a wet vent for a bathroom group. Only one wet-vented fixture drain or trap arm shall discharge upstream of the dry-vented fixture drain connection. Dry vent connections to the horizontal wet vent shall be in accordance with Section 905.2 and Section 905.3.

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Plumbing Inspection

908.2.2 Size.

The wet vent shall be sized based on the fixture unit discharge into the wet vent. The wet vent shall be not less than 2 inches (50 mm) in diameter for 4 drainage fixture units (dfu) or less, and not less than 3 inches (80 mm) in diameter for 5 dfu or more. The dry vent shall be sized in accordance with Table 702.1 and Table 703.2 based on the total fixture units discharging into the wet vent. (DOSE NOT INCLUDE WC)

908.2.3 Trap Arm.

The length of the trap arm shall not exceed the limits in Table 1002.2. The trap size shall be in accordance with Section 1003.3. The vent pipe opening from the horizontal wet vent, except for water closets and similar fixtures, shall not be below the weir of the trap.

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Plumbing Inspection

908.2.4 Water Closet.

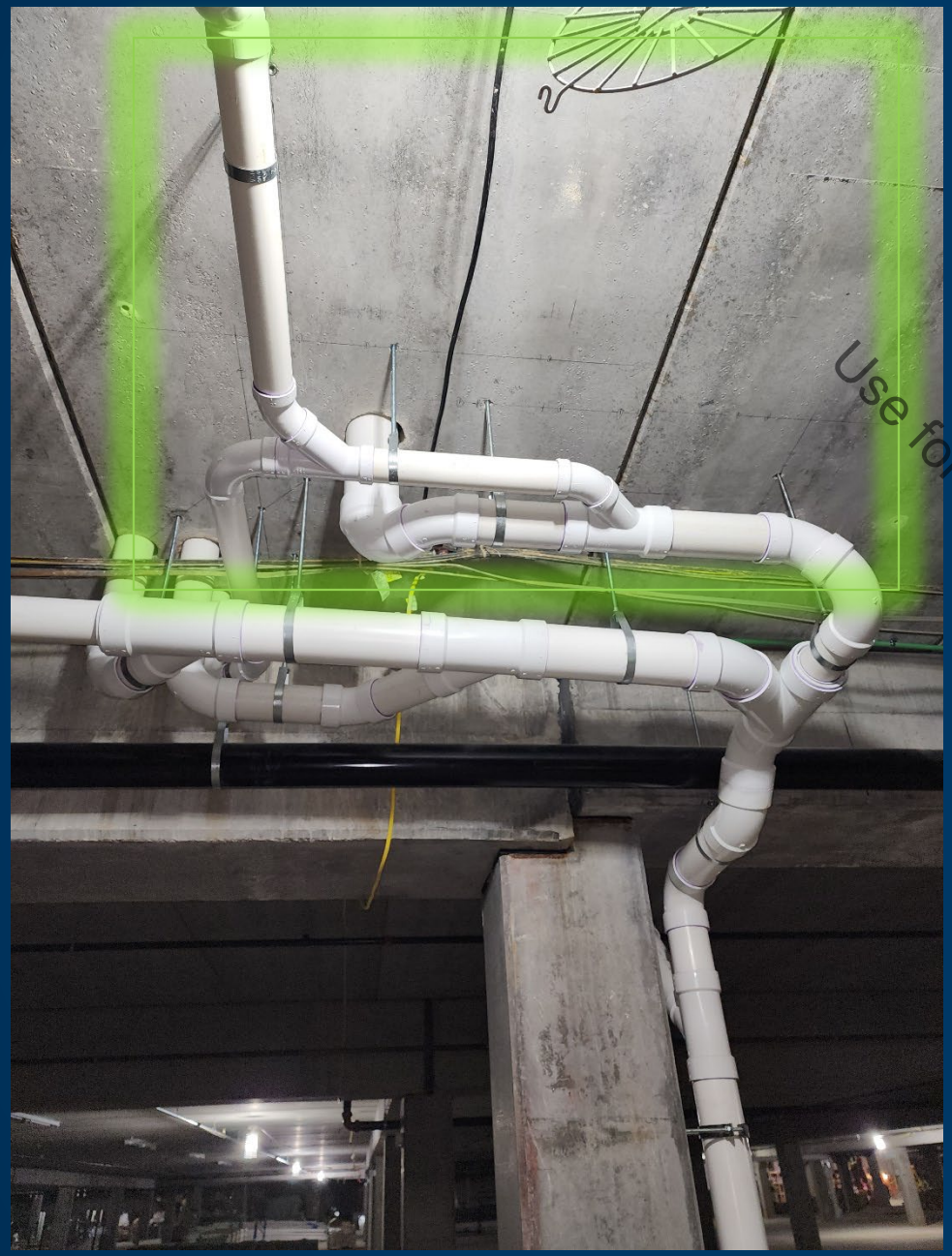
The water closet fixture drain or trap arm connection to the wet vent shall be downstream of fixture drain or trap arm connections to the horizontal wet vent.

908.2.5 Additional Fixtures.

Additional fixtures shall discharge downstream of the wet vent system and be conventionally vented. Only the fixtures within the bathroom group shall connect to the wet-vented horizontal branch.

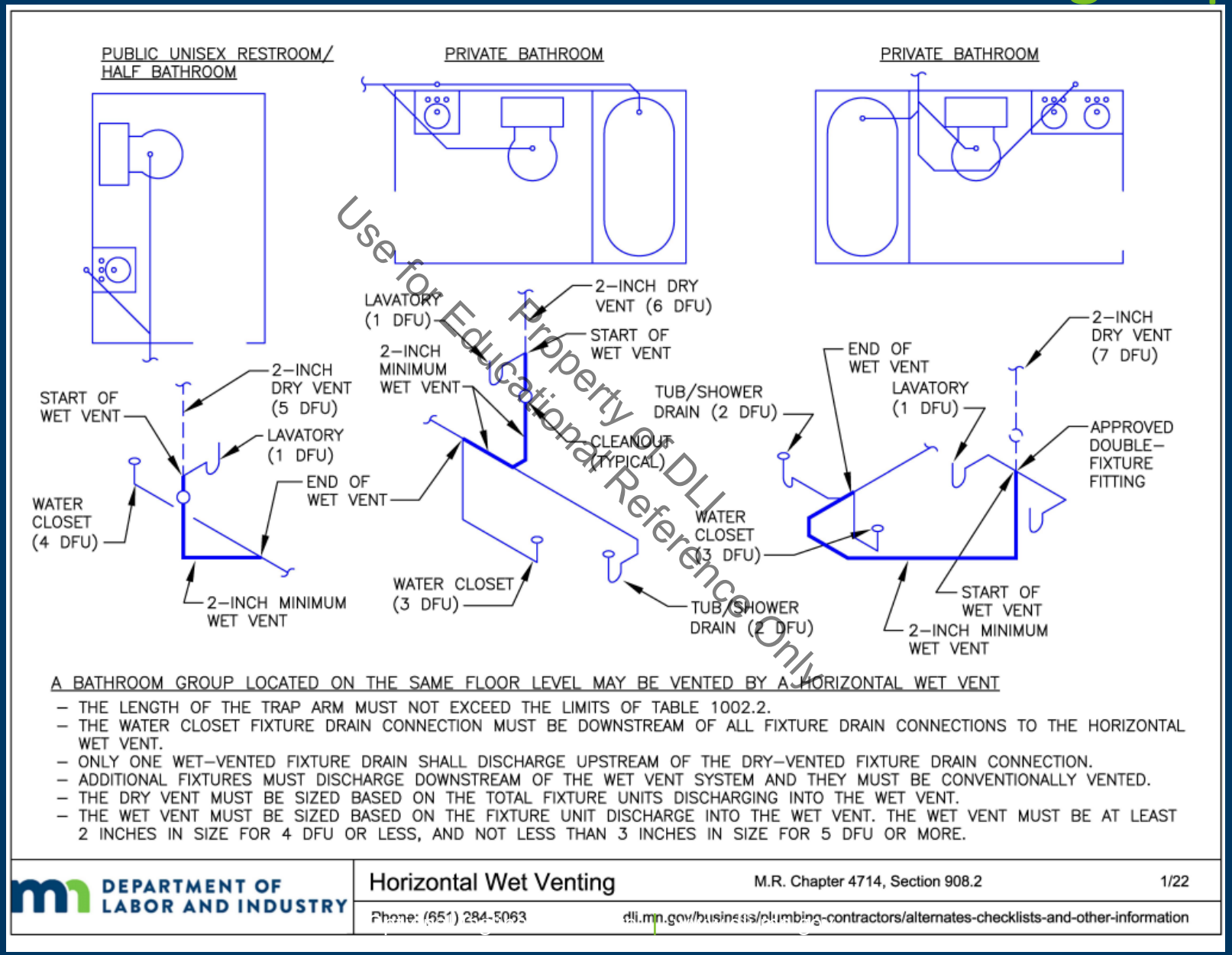
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Plumbing Inspection



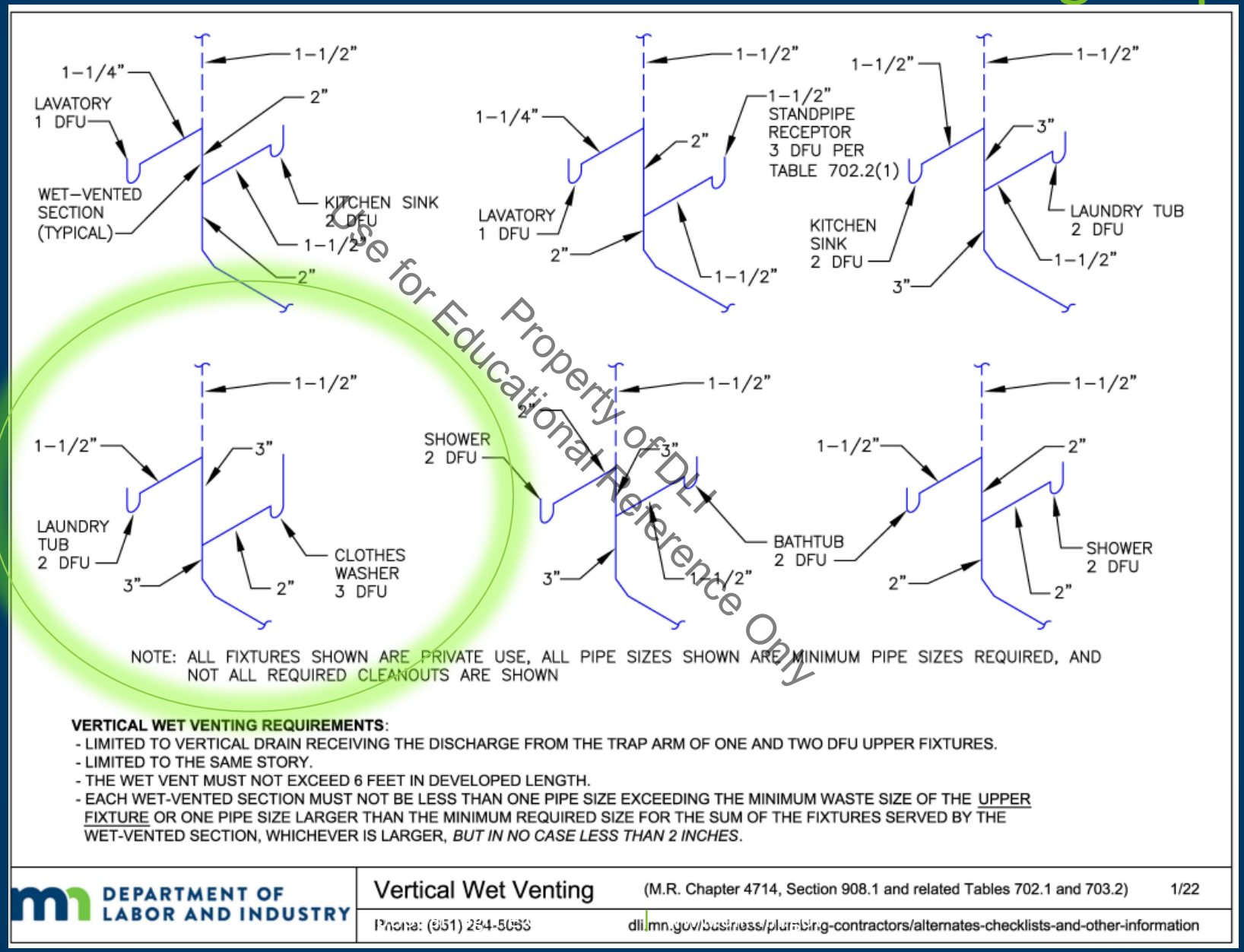
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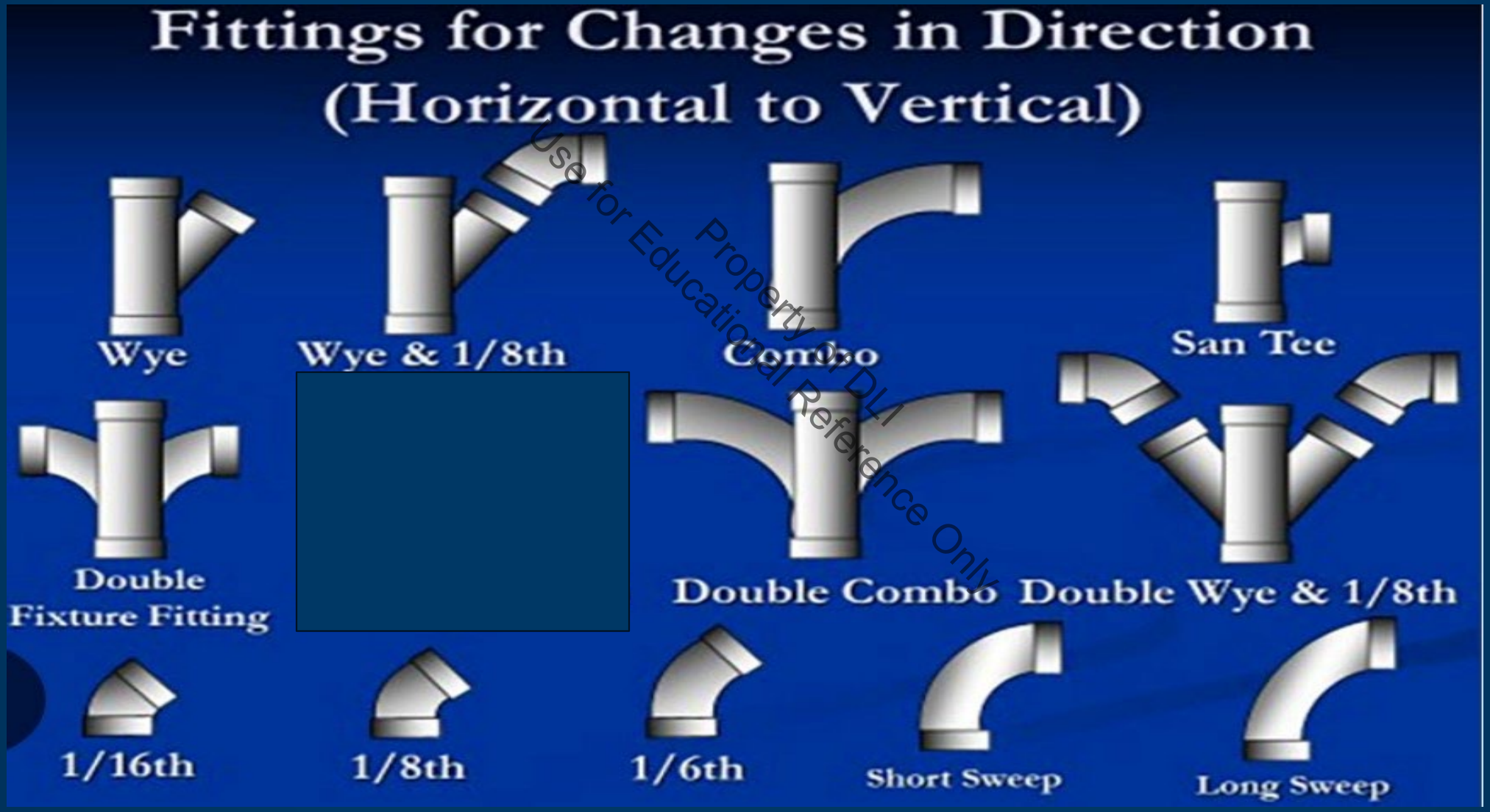
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Plumbing Inspection



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Plumbing Inspection



Plumbing Inspection

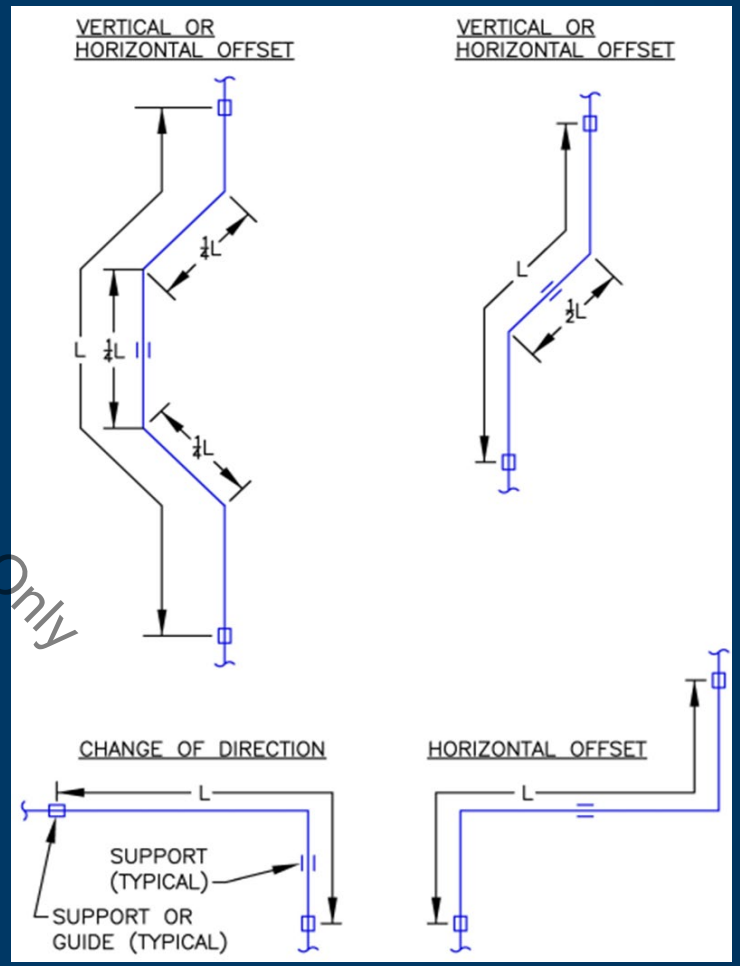
- Expansion for ABS and PVC DWV and Storm Pipe per Table 313.3.1

INSIDE THE BUILDING THERMAL ENVELOPE			
	LENGTH OF RUN (FEET)		
	10 FT	20 FT	30 FT
PIPE SIZE (INCHES)	L = EXPANSION JOINT LENGTH (INCHES)		
1.5	20	28	34
2	22	31	38
3	27	38	46
4	30	43	52
6	37	52	63
8	42	59	72
10	47	66	80
12	51	72	88

OUTSIDE THE BUILDING THERMAL ENVELOPE			
	LENGTH OF RUN (FEET)		
	10 FT	20 FT	30 FT
PIPE SIZE (INCHES)	L = EXPANSION JOINT LENGTH (INCHES)		
1.5	26	36	44
2	29	41	50
3	35	49	60
4	40	56	68
6	48	68	83
8	55	77	94
10	61	86	105
12	66	94	114

NOTE: MULTIPLE OFFSETS SHALL BE ALLOWED TO PROVIDE EXPANSION FOR EACH 30-FOOT DEVELOPED LENGTH OF RUN

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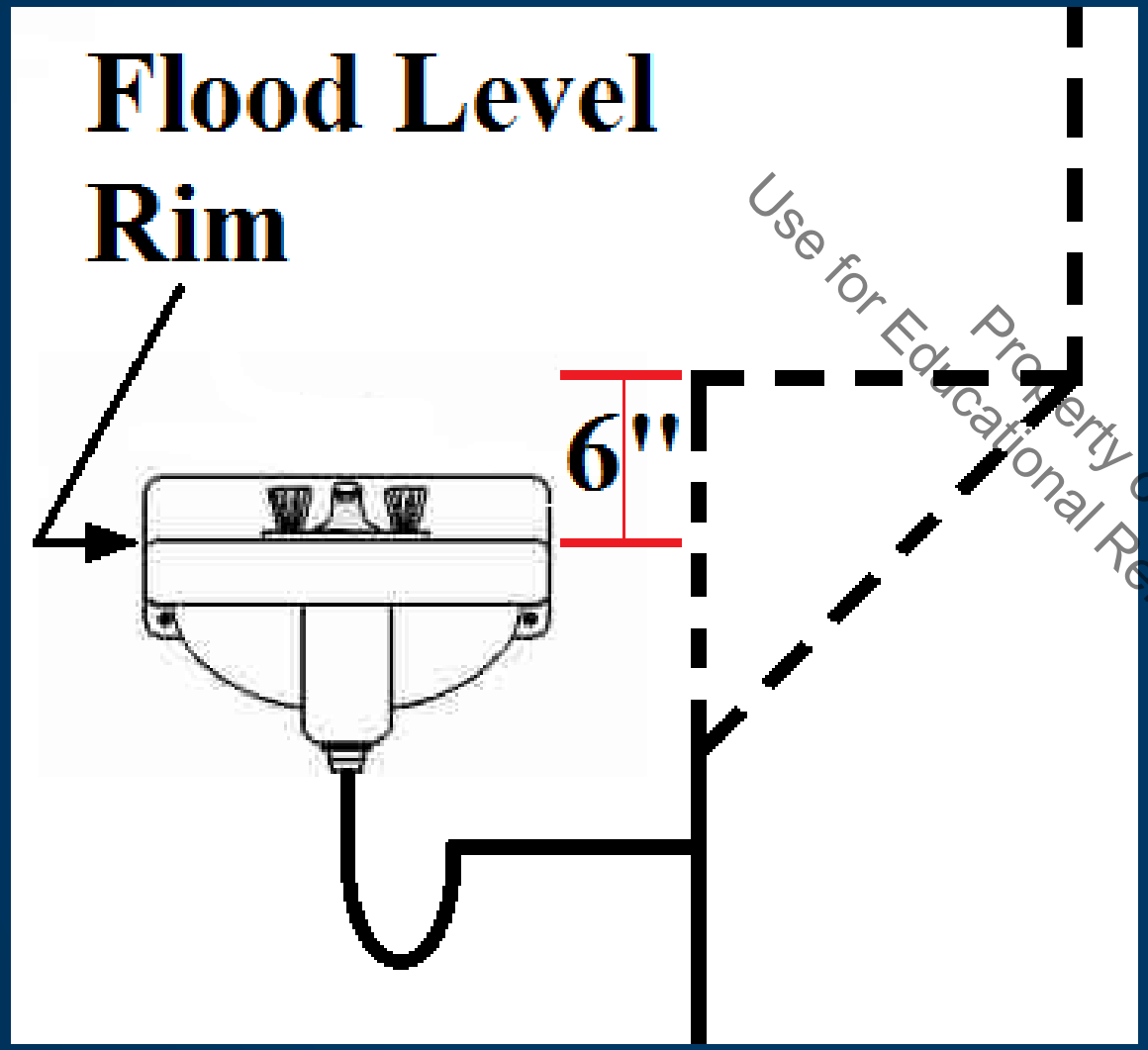
Hangers and Supports

TABLE 313.1
HANGERS AND SUPPORTS

MATERIALS	TYPES OF JOINTS	HORIZONTAL	VERTICAL
Cast	Lead and Oakum	5 feet, except 10 feet where 10 foot lengths are installed[1, 2, 3]	Base and each floor, not to exceed 15 feet
	Compression Gasket	Every other joint, unless over 4 feet then support each joint[1, 2, 3]	Base and each floor, not to exceed 15 feet
Cast-Iron Hubless	Shielded Coupling	Every other joint, unless over 4 feet then support each joint[1,2,3,4]	Base and each floor, not to exceed 15 feet
Copper Tube and Pipe	Soldered or Brazed	1½ inches and smaller, 6 feet; 2 inches and larger, 10 feet	Each floor, not to exceed 10 feet[5]
Steel and Brass Pipe for Water or DWV	Threaded or Welded	¾ inch and smaller, 10 feet; 1 inch and larger, 12 feet	Every other floor, not to exceed 25 feet[5]
Steel, Brass, and Tinned Copper Pipe for Gas	Threaded or Welded	½ inch, 6 feet; ¾ inch and 1 inch, 8 feet; 1¼ inches and larger, 10 feet	½ inch, 6 feet; ¾ inch and 1 inch, 8 feet; 1¼ inches every floor level
Schedule 40 PVC and ABS DWV	Solvent Cemented	All sizes, 4 feet; allow for expansion every 30 feet[3,6]	Base and each floor; provide mid-story guides; provide for expansion every 30 feet[6]
CPVC	Solvent Cemented	1 inch and smaller, 3 feet; 1¼ inches and larger, 4 feet	Base and each floor; provide mid-story guides[6]
Lead	Wiped or Burned	Continuous Support	Not to exceed 4 feet
Copper	Mechanical	In accordance with standards acceptable to the Authority Having Jurisdiction	
Steel and Brass	Mechanical	In accordance with standards acceptable to the Authority Having Jurisdiction	
PEX	Cold Expansion, Insert and Compression	1 inch and smaller, 32 inches; 1¼ inches and larger, 4 feet	Base and each floor; provide mid-story guides
PEX-AL-PEX	Metal Insert and Metal Compression	½ inch, ¾ inch, 1 inch: All sizes 98 inches	Base and each floor; provide mid-story guides
PE-AL-PE	Metal Insert and Metal Compression	½ inch, ¾ inch, 1 inch: All sizes 98 inches	Base and each floor; provide mid-story guides
Polypropylene (PP)	Fusion weld (socket, butt, saddle, electrofusion), threaded (metal threads only), or mechanical	1 inch and smaller, 32 inches; 1¼ inches and larger, 4 feet	Base and each floor; provide mid-story guides

Use for Educational Reference Only
Property of DLI

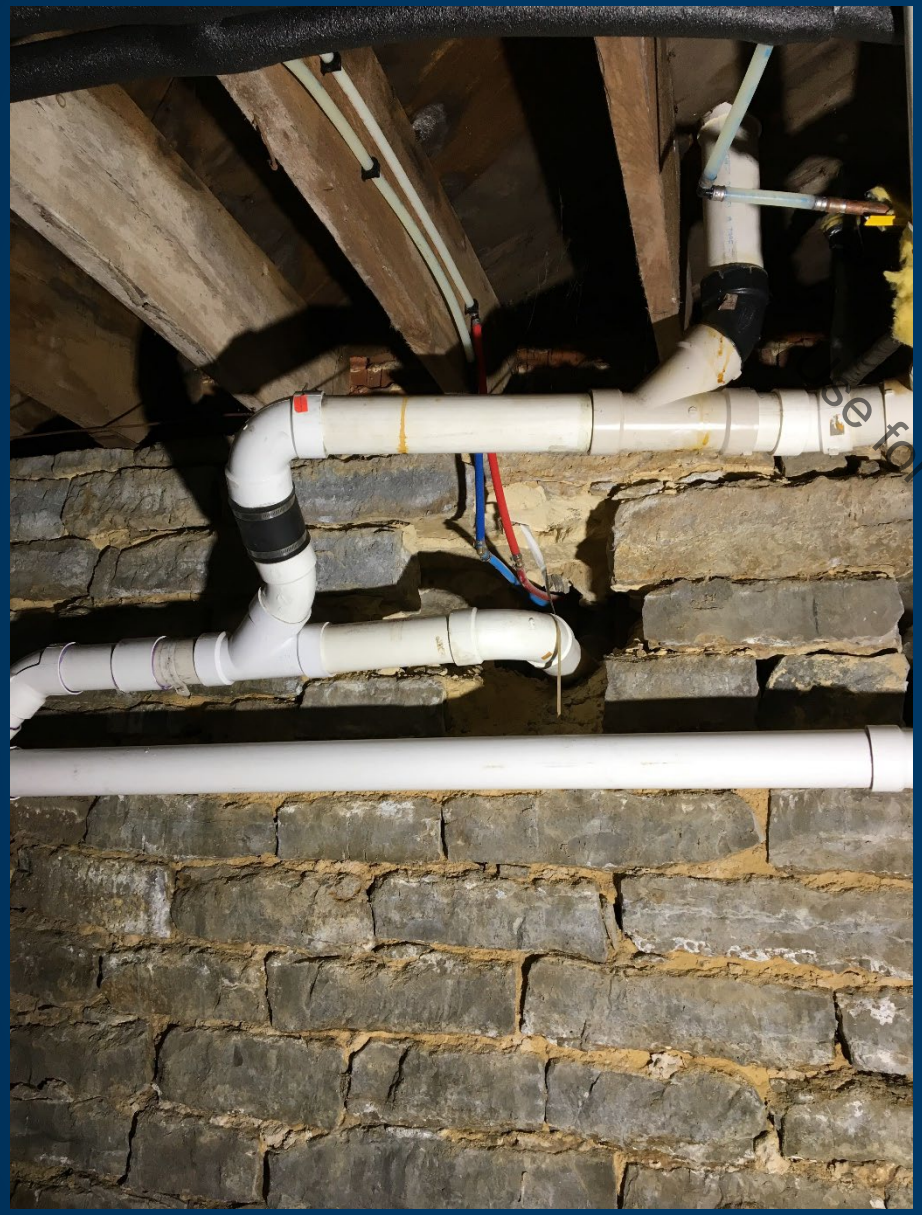
Plumbing Inspection



Property of DLI
Use for Educational Reference Only

Vents are to be vertical not to go horizontal until they are 6” above the flood rim. Adjacent fixtures are required to tie in 6” above the flood level rim as well.

Plumbing Inspection



No mixing of types of material.
(PVC and ABS)

Property of DLI
For Educational Reference Only

Plumbing Inspection

- Glues & Primers

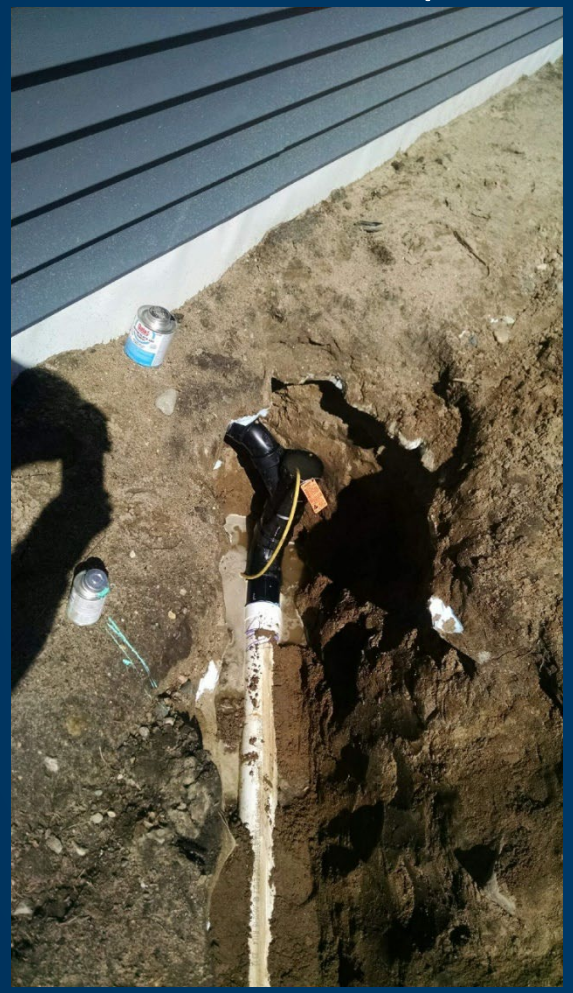




Use for Educational Reference Only
Property of DLR

Plumbing Inspection

- Glues & Primers (OUTSIDE OF BUILDING AND ONE TIME ONLY)



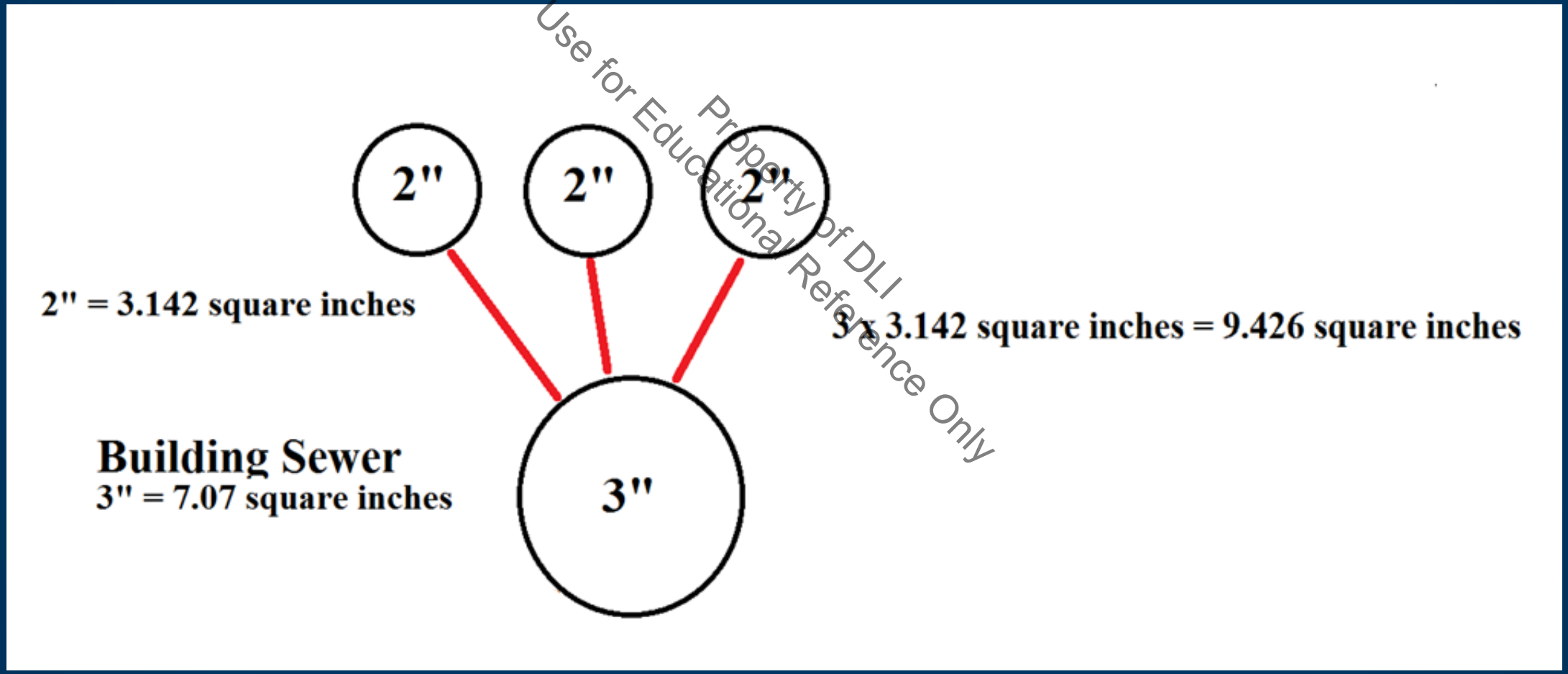


Property of DLI
Use for Educational Reference Only

705.10.4 Transition Joint. A solvent cement transition joint between ABS and PVC building drain and building sewer shall be made using listed transition solvent cement.

Plumbing Inspection

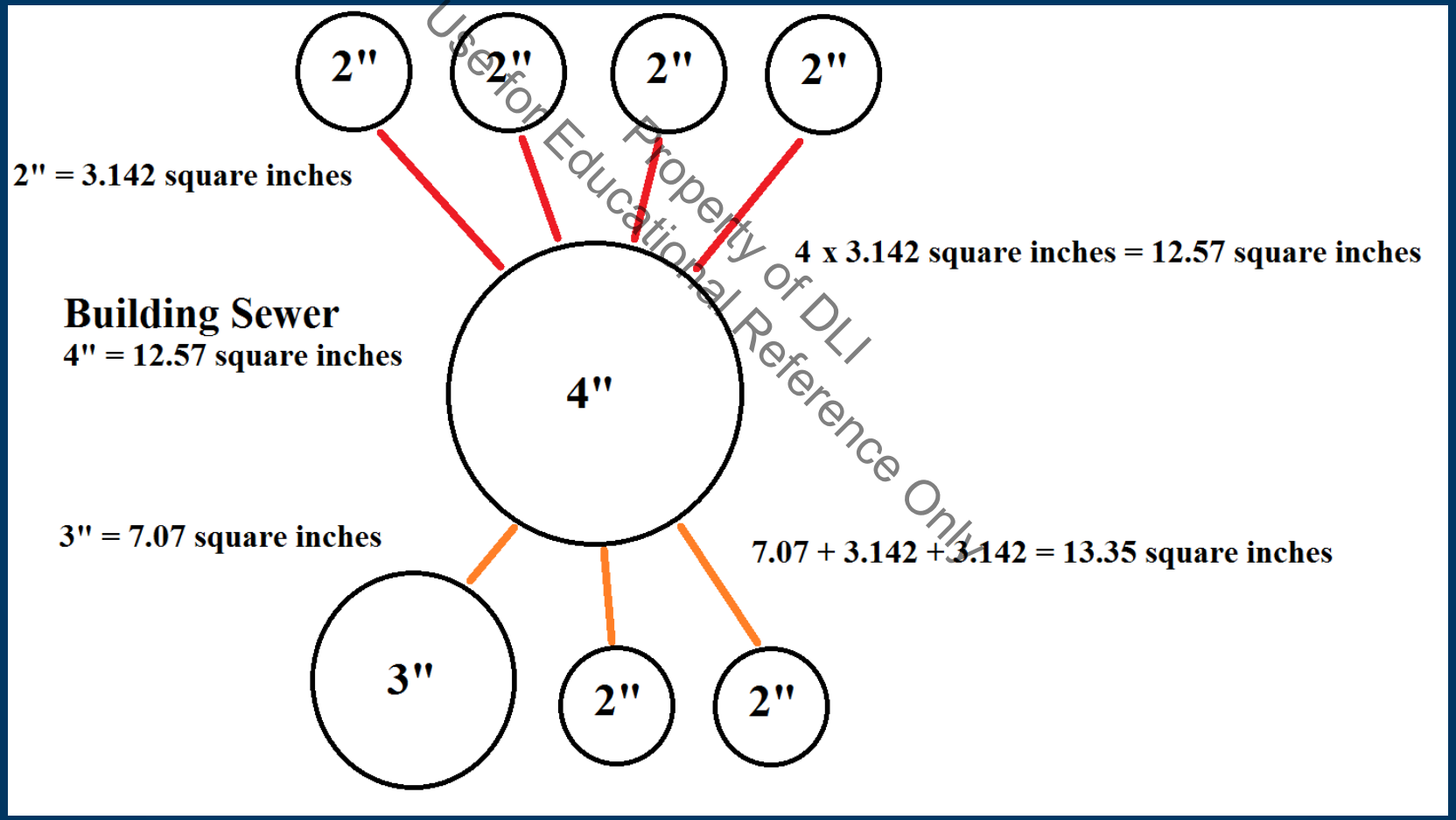
- Venting- Aggregate Cross-sectional Area



Property of DLI
Use for Educational Reference Only

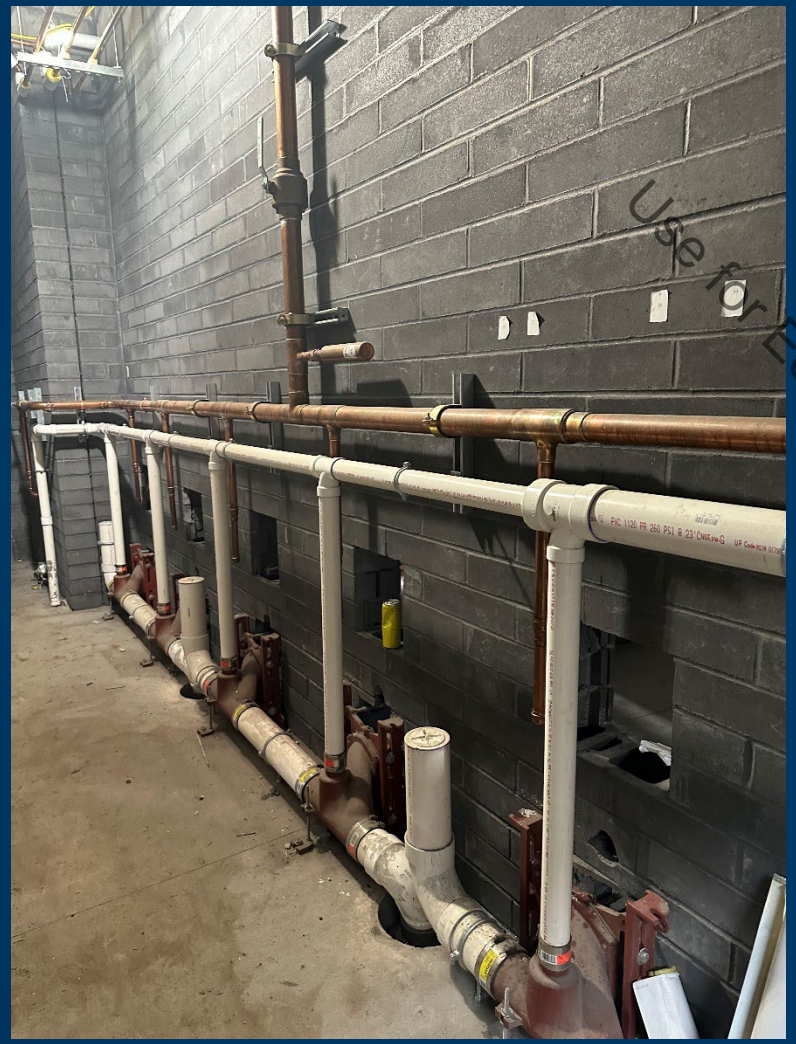
Plumbing Inspection

- Venting- Aggregate Cross-sectional Area



Property of DLI
Use for Educational Reference Only

Plumbing Inspection



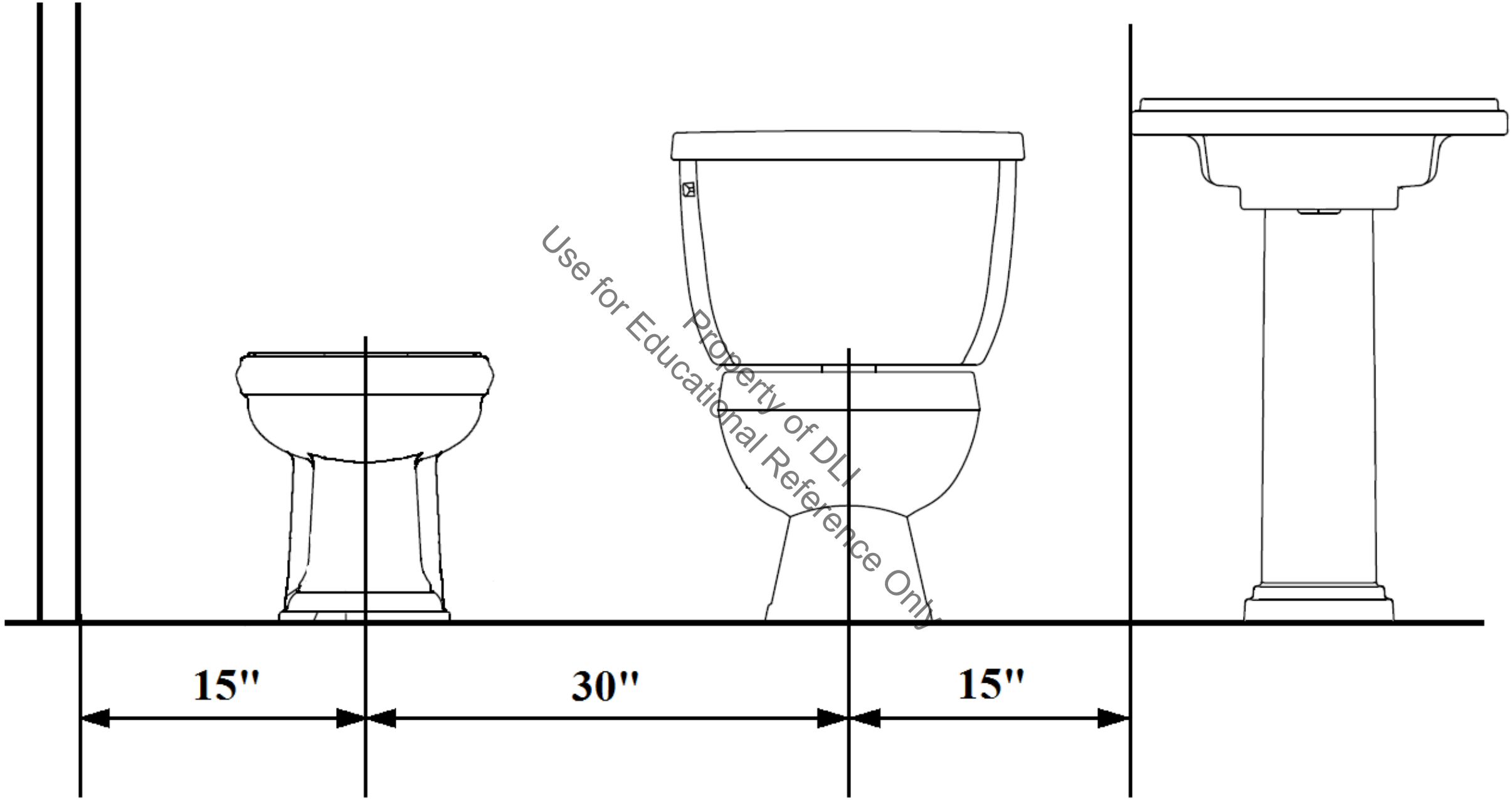


Use for Educational Reference Only
Property of DLI

Fixture Installation

- 308.1 General. Piping, fixtures, or equipment shall not be so located as to interfere with the normal use thereof or with the normal operation and use of windows, doors, or other required facilities.
- 402.5 Setting. Fixtures shall be set level and in proper alignment with reference to adjacent walls. No water closet or bidet shall be set closer than 15 inches from its center to a side wall or obstruction.
- No urinal shall be set closer than 12 inches from its center to a side wall or partition or closet than 24 inches center to center.

Use for Educational Reference Only
Property of DCI



Property of DLI
Use for Educational Reference Only

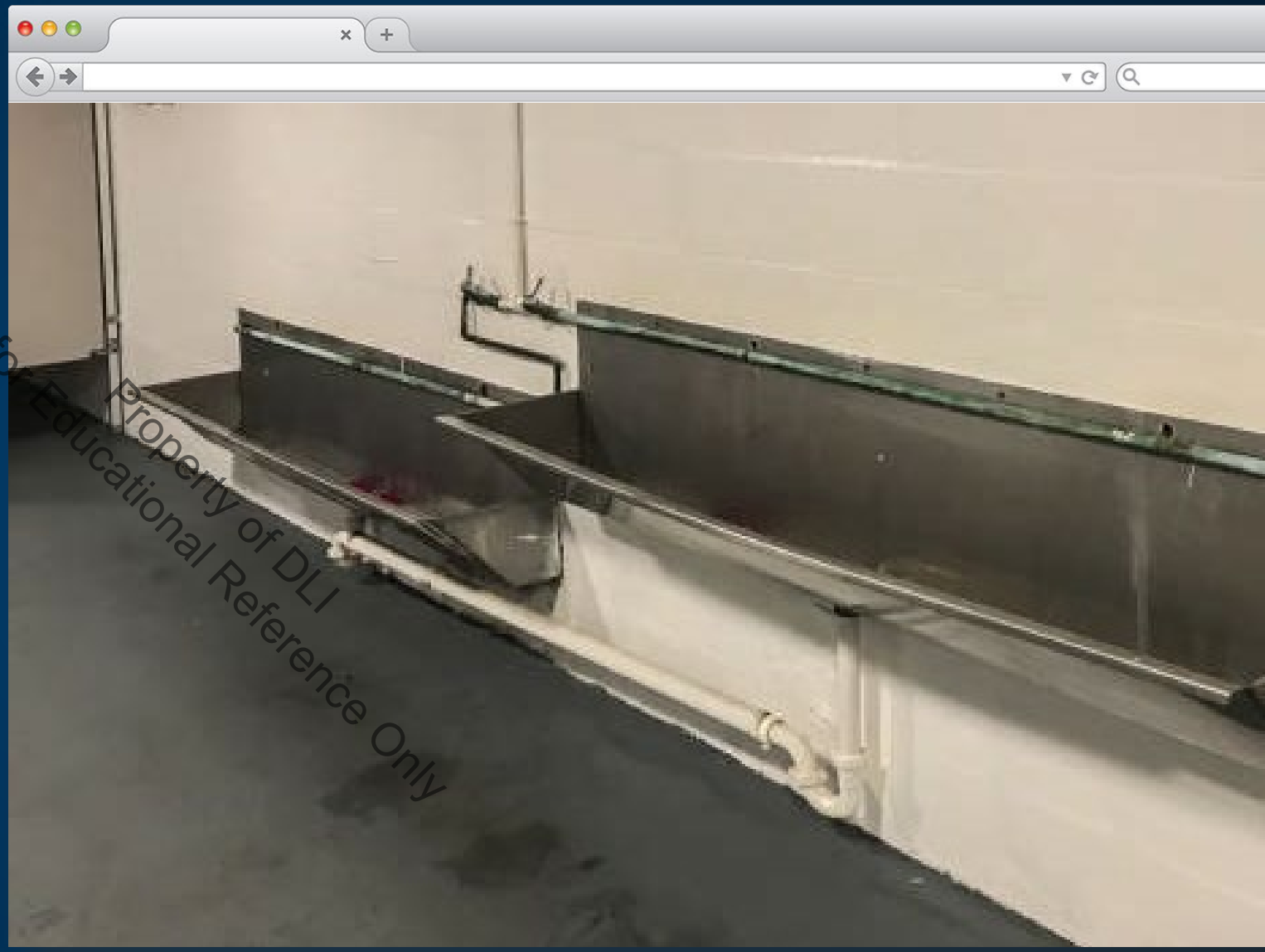
901.2 Vents Required. Each plumbing fixture trap, except as otherwise provided in this code, shall be protected against siphonage and backpressure, and air circulation shall be ensured throughout all parts of the drainage system by means of vent pipes installed in accordance with the requirements of this chapter and as otherwise required by this code.

Use for Educational Reference Only
Property of DLI



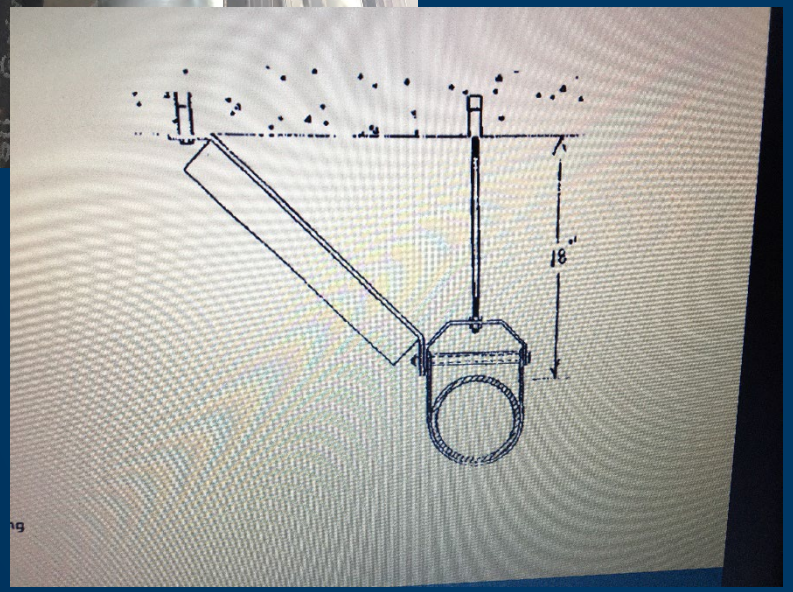
Plumbing Inspection

- Trough urinals are prohibited.



Storm Drains





1103.3 Reduction in Size Prohibited. *Except for siphonic roof drainage systems, storm drain piping shall not reduce in size in the direction of flow, including changes in direction from horizontal to vertical.*

1101.2 Where Required. *Roofs, paved areas, yards, courts, courtyards, vent shafts, light wells, or similar areas having rainwater, shall be drained into a separate storm sewer system or into a combined sewer system where a separate storm sewer system is not available, or to some other place of disposal satisfactory to the Authority Having Jurisdiction. In no case shall water from roofs or any building roof drainage flow onto the public sidewalk. In the case of one- and two-family dwellings, storm water shall be permitted to be discharged on flat areas, such as lawns, so long as the storm water shall flow away from the building and away from adjoining property and shall not create a nuisance.*

Use for Educational Reference Only
Property of DLI

1107.2.3

(3) *portions of storm drainage system and sewers that are located more than ten feet from buildings, more than ten feet from buried water lines, and more than 50 feet from water wells, and that do not pass through soil or water identified as being contaminated.*

Use for Educational Reference
Property of DLI



Plumbing Inspection

- Chapter 6 Water Distribution System
- The water distribution system is sized in water supply fixture units WSFU much like how the sanitary and vent system is sized in DFU
- The Section 610 and Table 610.4 determines sizing of the water system based on the total demand of fixtures/use of Table 610.3:

APPLIANCES, APPURTENANCES OR FIXTURES[2]	MINIMUM FIXTURE BRANCH PIPE SIZE[1,4] (inches)	PRIVATE	PUBLIC	ASSEMBLY[6]
Bathtub or Combination Bath/Shower (fill)	½	4.0	4.0	—
¾ inch Bathtub Fill Valve	¾	10.0	10.0	—
Bidet	½	1.0	—	—
Clothes Washer	½	4.0	4.0	—
Dental Unit, cuspidor	½	—	1.0	—
Dishwasher, domestic	½	1.5	1.5	—
Drinking Fountain or Water Cooler	½	0.5	0.5	0.75
Hose Bibb	½	2.5	2.5	—
Hose Bibb, each additional[8]	½	1.0	1.0	—
Lavatory (each basin), or hand sink	½	1.0	1.0	1.0
Lawn Sprinkler, each head[5]	—	1.0	1.0	—
Mobile Home, each (minimum)	—	12.0	—	—
Sinks	—	—	—	—
Bar	½	1.0	2.0	—
Clinical Faucet	½	—	3.0	—
Clinical Flushometer Valve with or without faucet	1	—	8.0	—
Kitchen, domestic with or without dishwasher	½	1.5	1.5	—
Laundry	½	1.5	1.5	—

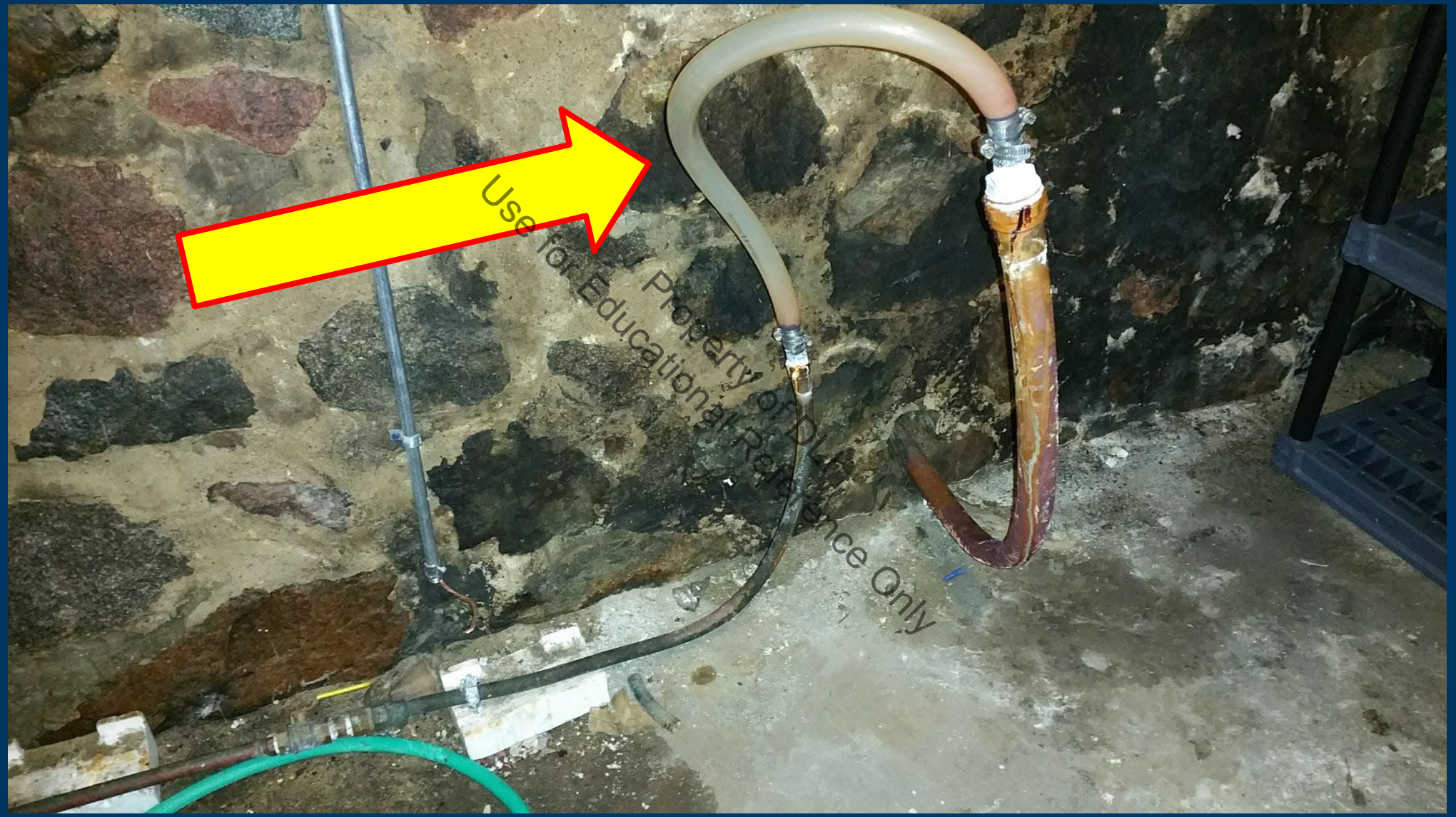
Use for Educational Reference Only
Property of DLI

609.11 Water Meters.

Exceptions: Where installation inside a building is not possible, the water meter may be installed in an enclosed structure not subject to flooding, high groundwater, or surface drainage runoff, provided the meter is protected from freezing. Provisions shall be made to install the meters above grade when possible. When installed below grade, the top of the structure shall be located at least 12 inches above the finished grade, be secured, and be accessible. This structure shall not be connected to any storm or sanitary sewer system.

Utah Department of Rail
Transportation Educational Reference Only

Plumbing Inspection



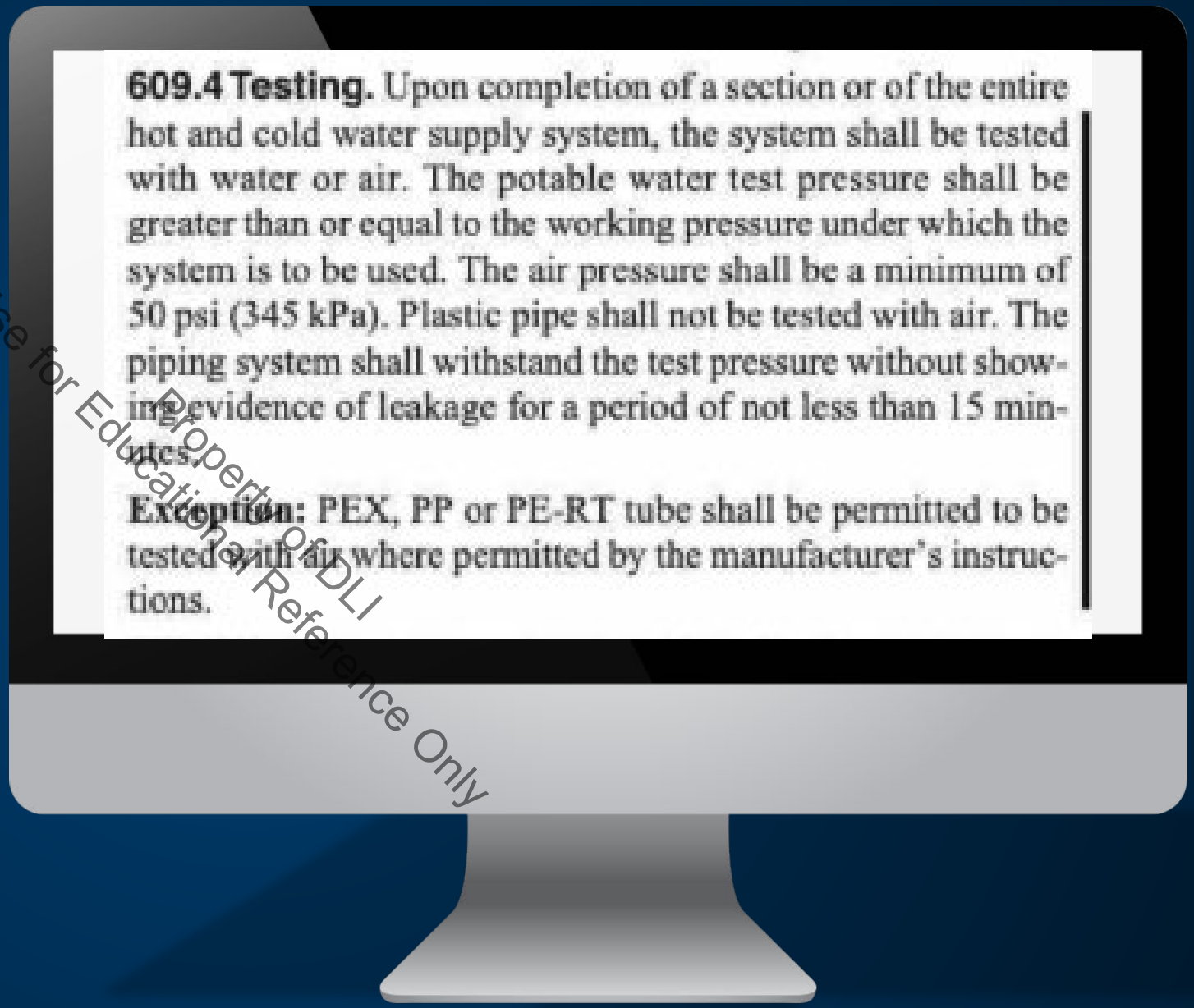
Plumbing Inspection

TABLE 604.1
MATERIALS FOR BUILDING SUPPLY AND WATER DISTRIBUTION PIPING AND FITTINGS

MATERIAL	BUILDING SUPPLY PIPE AND FITTINGS	WATER DISTRIBUTION PIPE AND FITTINGS	REFERENCED STANDARD(S) PIPE	REFERENCED STANDARD(S) FITTINGS
Copper and Copper Alloys	X	X	ASTM B42, ASTM B43, ASTM B75, ASTM B88, ASTM B135, ASTM B251, ASTM B302, ASTM B447	ASME B16.15, ASME B16.18, ASME B16.22, ASME B16.26, ASME B16.50[2], ASME B16.51, ASSE 1061
CPVC	X	X	ASTM D2846, ASTM F441, ASTM F442, CSA B137.6	ASSE 1061, ASTM D2846, ASTM F437, ASTM F438, ASTM F439, ASTM F1970, CSA B137.6
CPVC-AL-CPVC	X	X	ASTM F2855	ASTM D2846
Ductile-Iron	X	X	AWWA C151	ASME B16.4, AWWA C110, AWWA C153
Galvanized Steel	X	X	ASTM A53	—
Malleable Iron	X	X	—	ASME B16.3
PE	X[1]	—	ASTM D2239, ASTM D2737, ASTM D3035, AWWA C901, CSA B137.1	ASTM D2609, ASTM D2683, ASTM D3261, ASTM F1055, CSA B137.1
PE-AL-PE	X	X	ASTM F1282, CSA B137.9	ASTM F1282, ASTM F1974, CSA B137.9
PE-AL-PEX	X	X	ASTM F1986	ASTM F1986
PE-RT	X	X	ASTM F2769, CSA B137.18	ASTM D3261, ASTM F1055, ASSE 1061, ASTM F1807, ASTM F2098, ASTM F2159, ASTM F2735, ASTM F2769, CSA B137.18
PEX	X	X	ASTM F876, ASTM F877, CSA B137.5, AWWA C904[1]	ASSE 1061, ASTM F877, ASTM F1807, ASTM F1960, ASTM F1961, ASTM F2080, ASTM F2159, ASTM F2735, CSA B137.5
PEX-AL-PEX	X	X	ASTM F1281, CSA B137.10, ASTM F2262	ASTM F1281, ASTM F1974, ASTM F2434, CSA B137.10
PP	X	X	ASTM F2389, CSA B137.11	ASTM F2389, CSA B137.11
PVC	X[1]	—	ASTM D1785, ASTM D2241, AWWA C900	ASTM D2464, ASTM D2466, ASTM D2467, ASTM F1970, AWWA C907
Stainless Steel	X	X	ASTM A269, ASTM A312	—

Notes:
[1] For building supply or exterior cold-water applications, not for water distribution piping.
[2] For brazed fittings only.

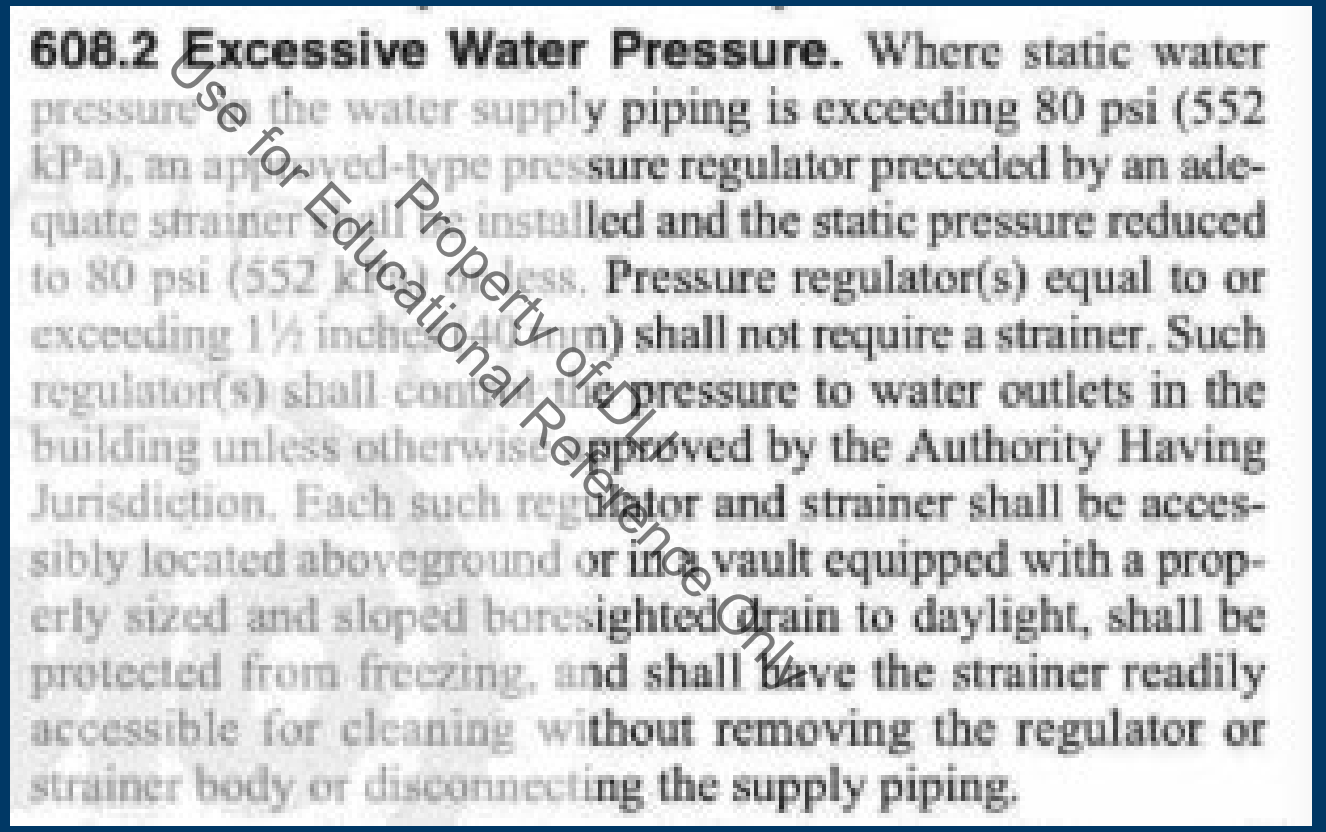
Property of DLI
Use for Educational Reference Only



Use for Education and Reference Only
Property of DLI

Plumbing Inspection

4714.608.2 Excess Water Pressure.



608.2 Excessive Water Pressure. Where static water pressure in the water supply piping is exceeding 80 psi (552 kPa), an approved-type pressure regulator preceded by an adequate strainer shall be installed and the static pressure reduced to 80 psi (552 kPa) or less. Pressure regulator(s) equal to or exceeding 1½ inches (40 mm) shall not require a strainer. Such regulator(s) shall control the pressure to water outlets in the building unless otherwise approved by the Authority Having Jurisdiction. Each such regulator and strainer shall be accessibly located aboveground or in a vault equipped with a properly sized and sloped boresighted drain to daylight, shall be protected from freezing, and shall have the strainer readily accessible for cleaning without removing the regulator or strainer body or disconnecting the supply piping.

Use for Educational Reference Only
Property of DLI

Plumbing Inspection

- Final Plumbing Inspection:
  - Manometer
  - Fixtures installed to code
  - Address Backflow

Property of DLI
Use for Educational Reference Only

Plumbing Inspection

712.5 Finished Plumbing.

After the plumbing fixtures have been set and their traps filled with water, their connections shall be tested and proven gastight and watertight by plugging the stack openings on the roof and the building drain where it leaves the building, and air introduced into the system equal to the pressure of a 1-inch water column. Such pressure shall remain constant for 15 minutes or the duration of the inspection without the introduction of additional air.

Use for Educational Reference Only
Property of PDI

Plumbing Inspection



Property of DLI
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Plumbing Inspection

Vacuum beaker wall hydrant, hose bibs, freeze resistant, automatic draining type.

ASSE 1019 - Vacuum breaker wall hydrants, hose bibbs, freeze resistant with automatic draining.

Act as a permanent means to protect against backflow including an air inlet for preventing back siphonage and a check valve for preventing backpressure backflow. These devices are terminal fittings that supply potable water to hose connections without danger of freezing



Use for Educational Reference Only Property of DLI

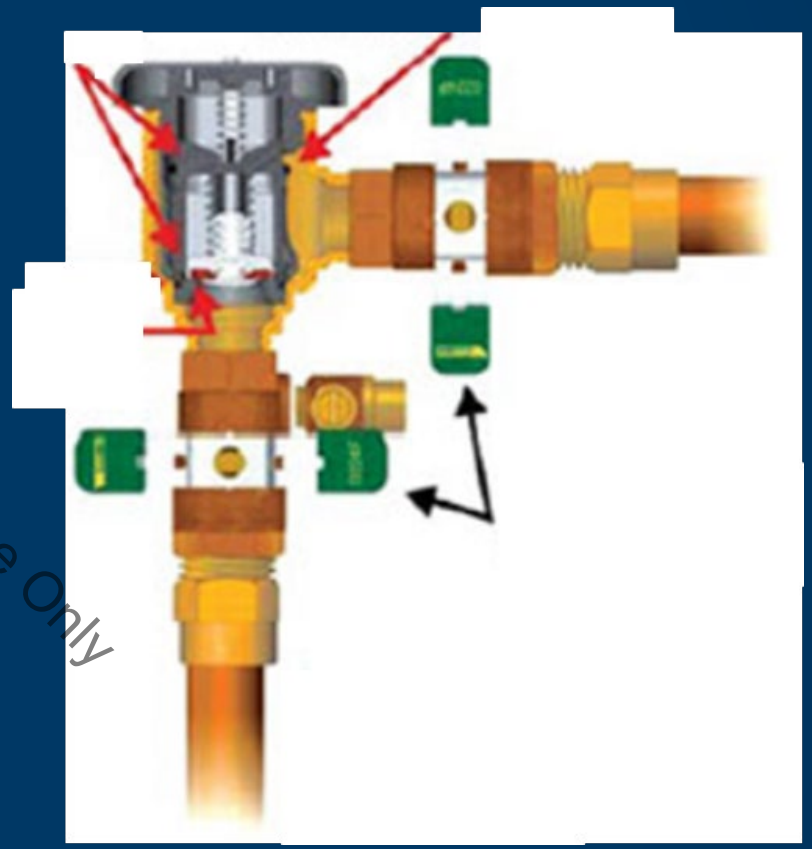
Plumbing Inspection

- Backflow prevention (lawn irrigation Section 603.5.6)

- Lawn irrigation systems designed without backpressure conditions, no pumps, no connections for pumping equipment downstream of the backflow device, or chemical injection may be protected by a properly installed and listed pressure vacuum breaker meeting ASSE 1020 or CSA B64.1.2 or a spill-resistant pressure vacuum breaker meeting ASSE 1056.

4714.603.2

- The backflow prevention assembly shall be tested by a certified backflow assembly tester at the time of installation, repair, or relocation and not less than on an annual schedule thereafter.



Use for Educational Reference Only Property of DLI

Plumbing Inspection

4714.603.4.9 Prohibited Locations.

Backflow prevention devices with atmospheric vents or parts shall not be installed in pits, underground, or submerged locations.



Plumbing Inspection

- **Hose connection backflow preventers.**



- ASSE 1052
- Low Hazard – Back Siphonage
- High Hazard – Back Siphonage
- Such devices are not for use under continuous pressure conditions.

Property of DLI
Use for Educational Reference Only

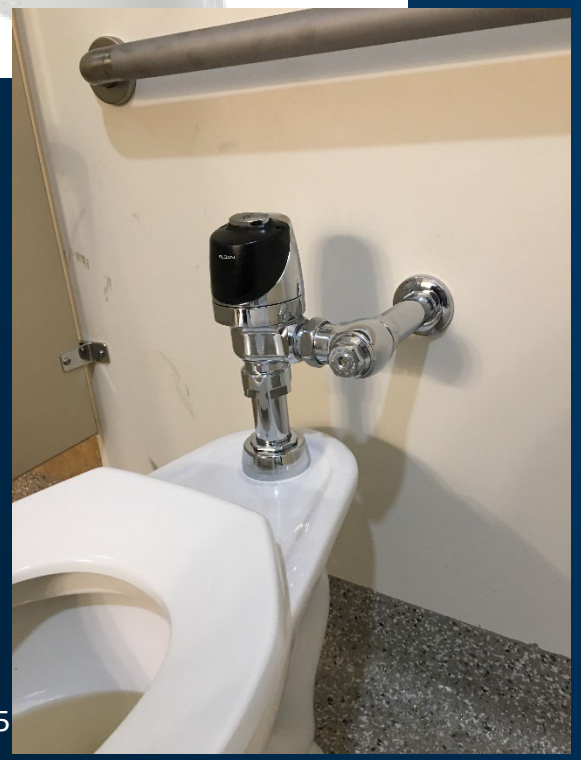
Plumbing Inspection



- **Hose connection vacuum breakers.**
- ASSE 1011
- Low Hazard – Back Siphonage
- High Hazard – Back Siphonage
- Such devices are not for use under continuous pressure conditions. No valve downstream.

Property of DLI
Use for Educational Reference Only





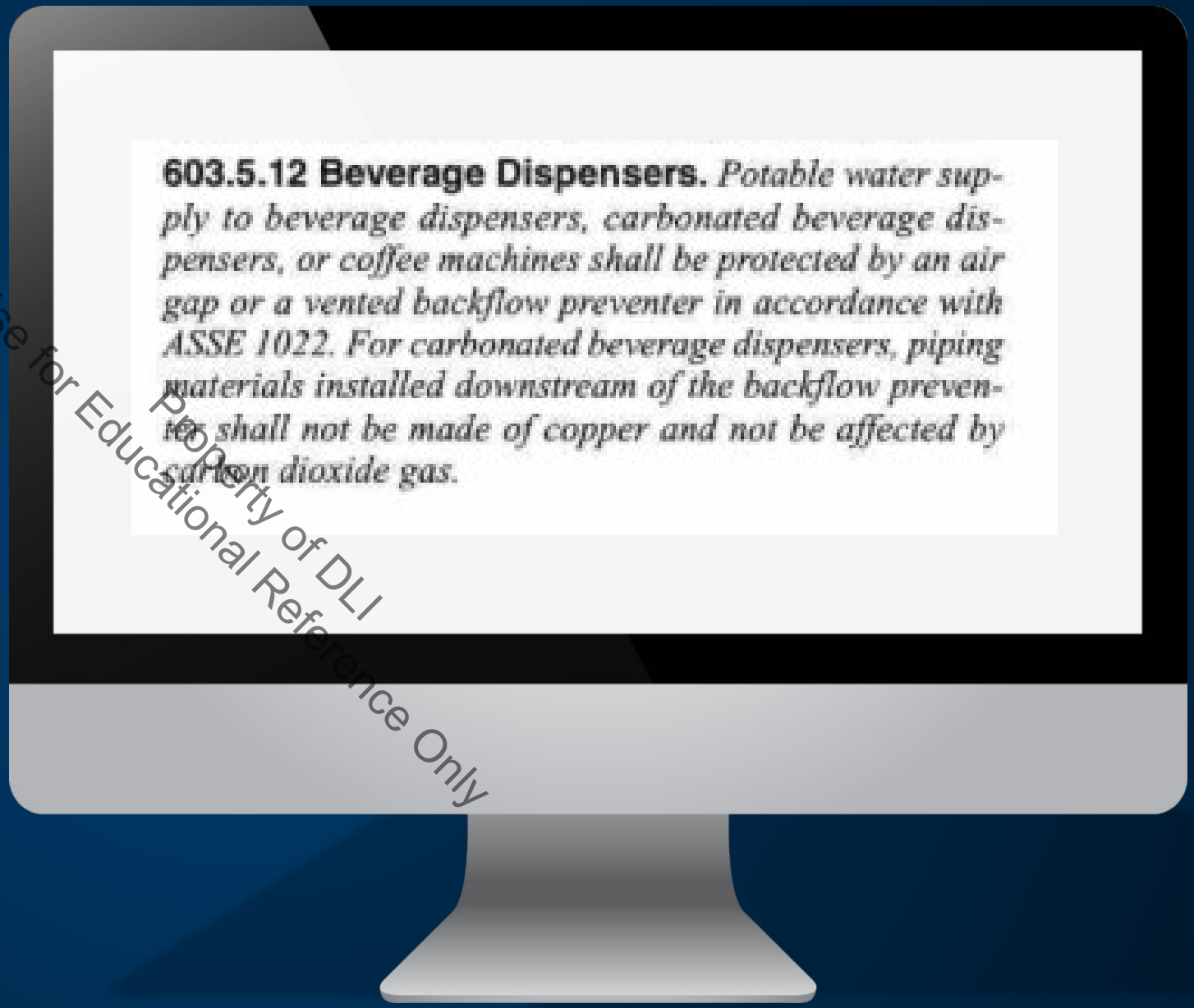
603.5.1 Atmospheric Vacuum Breaker. Water closet and urinal flushometer valves shall be protected against backflow by an approved backflow prevention assembly, device, or method. Where the valves are equipped with an atmospheric vacuum breaker, the vacuum breaker shall be installed on the discharge side of the flushometer valve with the critical level not less than 6 inches (152 mm), or the distance according to its listing, above the overflow rim of a water closet bowl or the highest part of a urinal.

Use for Educational Reference Only
Property of DLI



603.5.2 Ballcock. Water closet and urinal tanks shall be equipped with a ballcock. The ballcock shall be installed with the critical level not less than 1 inch (25.4 mm) above the full opening of the overflow pipe. In cases where the ballcock has no hush tube, the bottom of the water supply inlet shall be installed 1 inch (25.4 mm) above the full opening of the overflow pipe.

Use for Educational Reference Only
Property of DLI



Use for Educational Reference Only
Property of DLI

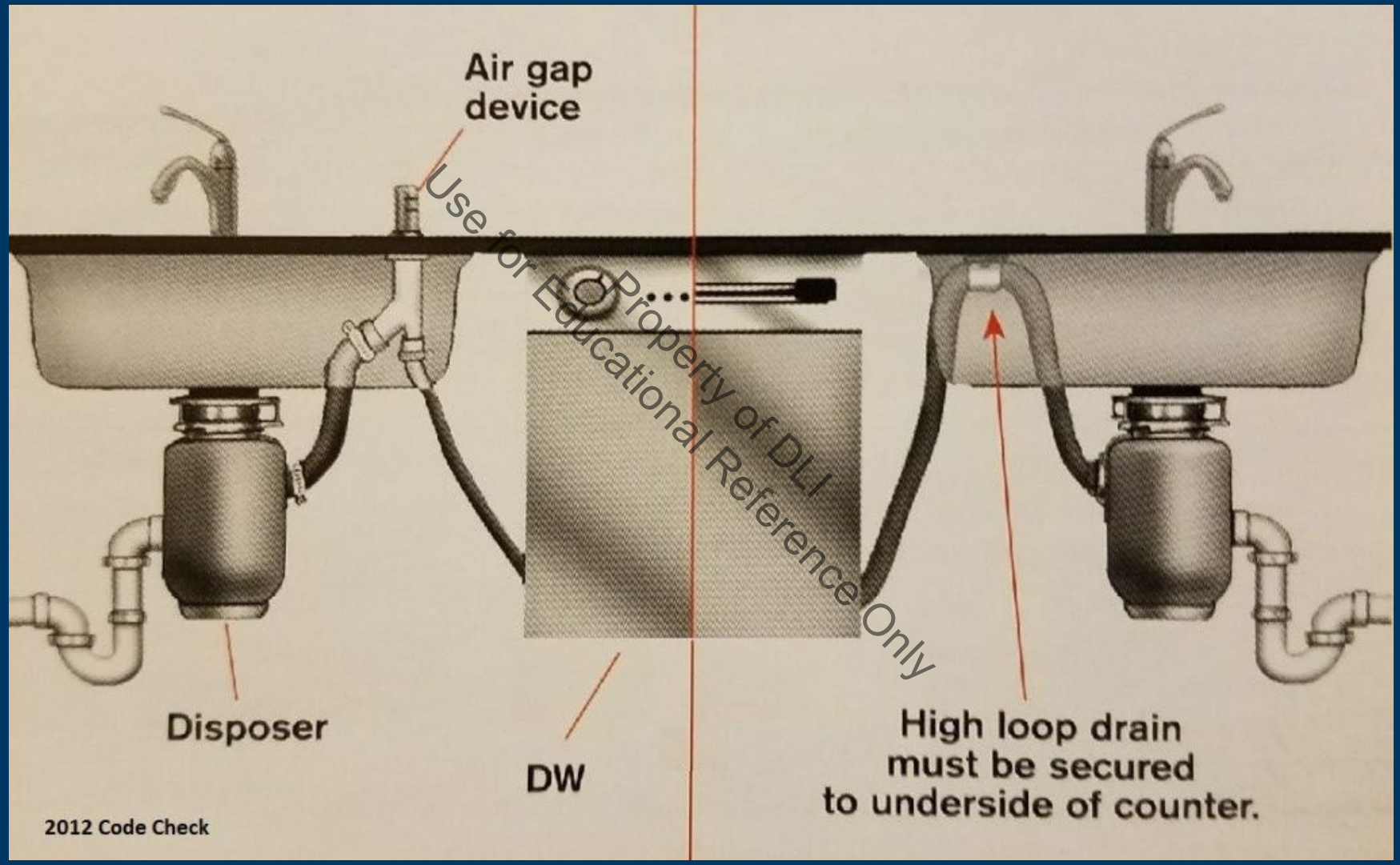
807.0 Appliances.

807.3 Domestic Dishwashing Machine.

No domestic dishwashing machine shall be directly connected to a drainage system or food waste disposer without the use of an approved dishwasher air gap fitting on the discharge side of the dishwashing machine **or run the discharge line as high as possible under the countertop, securely fastened**. Listed air gaps shall be installed with the flood level (FL) marking at or above the flood level of the sink or drainboard, whichever is higher.

Use for Educational Purposes Only
Property of Duval County

Plumbing Inspection



Property of DLI
Use for Educational Reference Only

Plumbing Inspection



420.4 Waste Outlet. *Kitchen and laundry sinks shall have a waste outlet and fixture tailpiece not less than 1½ inches (40 mm) in diameter, except commercial pot and scullery sinks shall be provided with waste outlets not less than 2 inches (50 mm) in diameter. Service sinks shall have a waste outlet and fixture tailpiece not less than 2 inches (50 mm) in diameter. Fixture tailpieces shall be constructed from the materials specified in Section 701.2 for drainage piping, pro-*

Use for Educational Reference Only
Property of DLI

Plumbing Inspection

- **WATER HEATERS**
- **504.4 Pressure-Limiting Devices**
- **504.5 Temperature-Limiting Devices**
- **504.6 Temperature, Pressure, and Vacuum Relief Devices**
  - Water heaters shall be installed with a temperature and pressure limiting device. Commonly known as a T&P.
  - Discharge piping shall be installed in accordance with Section 608.5.
  - Water heater shall have a fullway valve on the cold supply 606.606.2

Property of EEI
Use for Educational Reference Only

Plumbing Inspection



T & P Relief

Property of DLI
Use for Educational Reference Only

- **604.13 Water Heater Connectors**
  - Copper, copper alloy, or stainless-steel flexible connectors shall not exceed 24”.
  - PEX, PEX-AL-PEX, PE-AL-PE, or PE-RT tubing shall not be installed with the first 18” of piping connected to a water heater.

Property of DLI
Use for Educational Reference Only

- **609.5 Unions**
  - Unions shall be installed in the water supply piping not more than 12” of the regulating equipment, water heating, conditioning tanks, and similar equipment that requires service by removal or replacement in a manner that will facilitate its ready removal

Property of Duke
Educational Reference Only
Use for Educational Reference Only

- **507.1 Dielectric Insulator**
  - The AHJ shall have the authority to require the use of an approved dielectric insulator on the water piping connections of water heaters and related water heating appliances.





Use for Educational Reference Only
Property of DLI

Plumbing Inspection



Property of DLI
Use for Educational Reference Only

4714.507.5 Pan drain size –

The drain size from a drainage pan beneath a water heater located where damage results from leaking water heater must not be less than ¾ of an inch.

Plumbing Inspection



Property of DLI
Use for Educational Reference Only

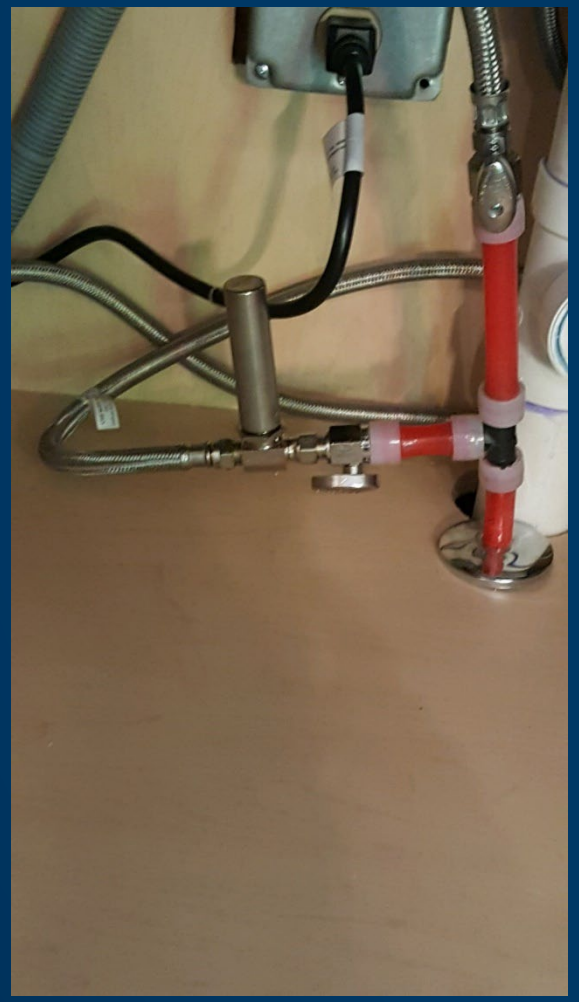
- **609.10 Water Hammer**

- Building supply systems where water hammer occurs shall be provided with water hammer arrestors to absorb the resulting high pressures…

Use for Educational Reference Only
Property of DLI

Plumbing Inspection

- Water Hammer Arrestors





Use for Educational Reference Only
Property of DLI

Plumbing Inspection

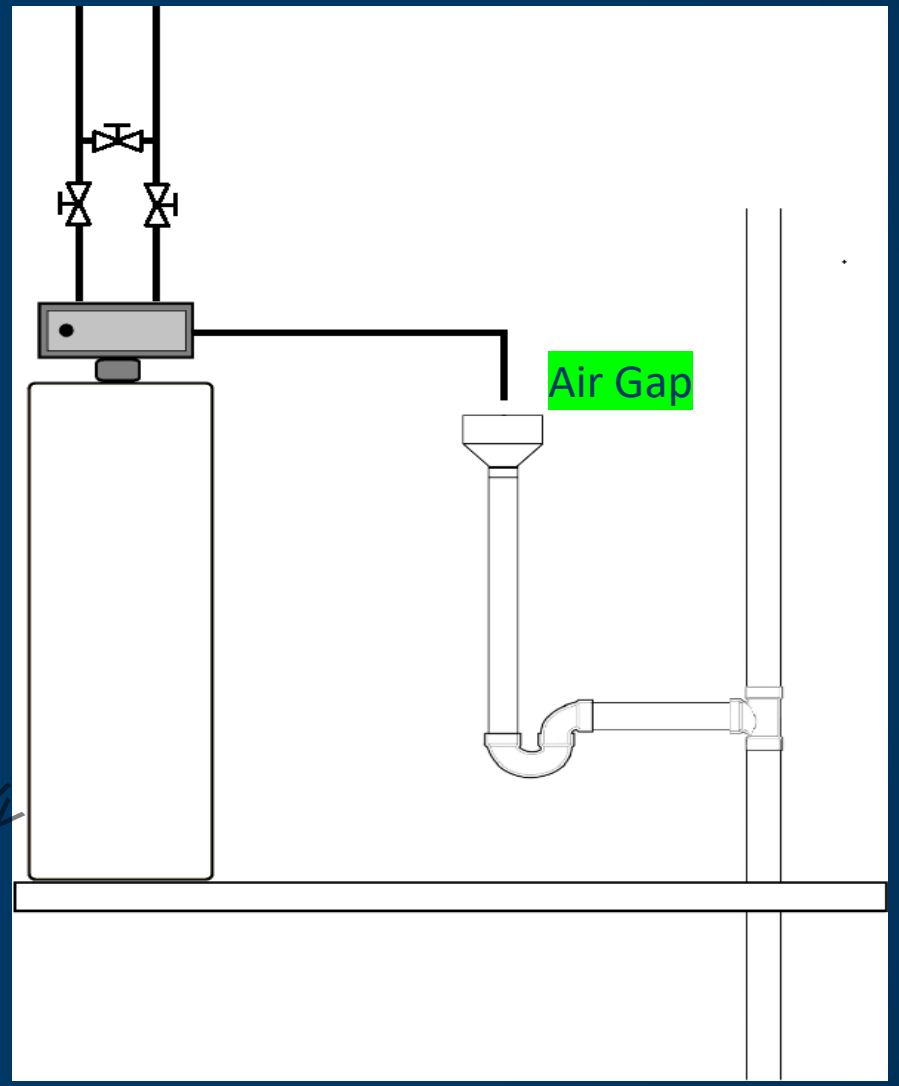
TABLE 603.3.1
MINIMUM AIR GAPS FOR WATER DISTRIBUTION[4]

FIXTURES	WHERE NOT AFFECTED BY SIDEWALLS[1] (inches)	WHERE AFFECTED BY SIDEWALLS[2] (inches)
Effective openings[3] not greater than ½ of an inch in diameter	1	1½
Effective openings[3] not greater than ¾ of an inch in diameter	1½	2¼
Effective openings[3] not greater than 1 inch in diameter	2	3
Effective openings[3] greater than 1 inch in diameter	Two times the diameter of effective opening	Three times the diameter of effective opening

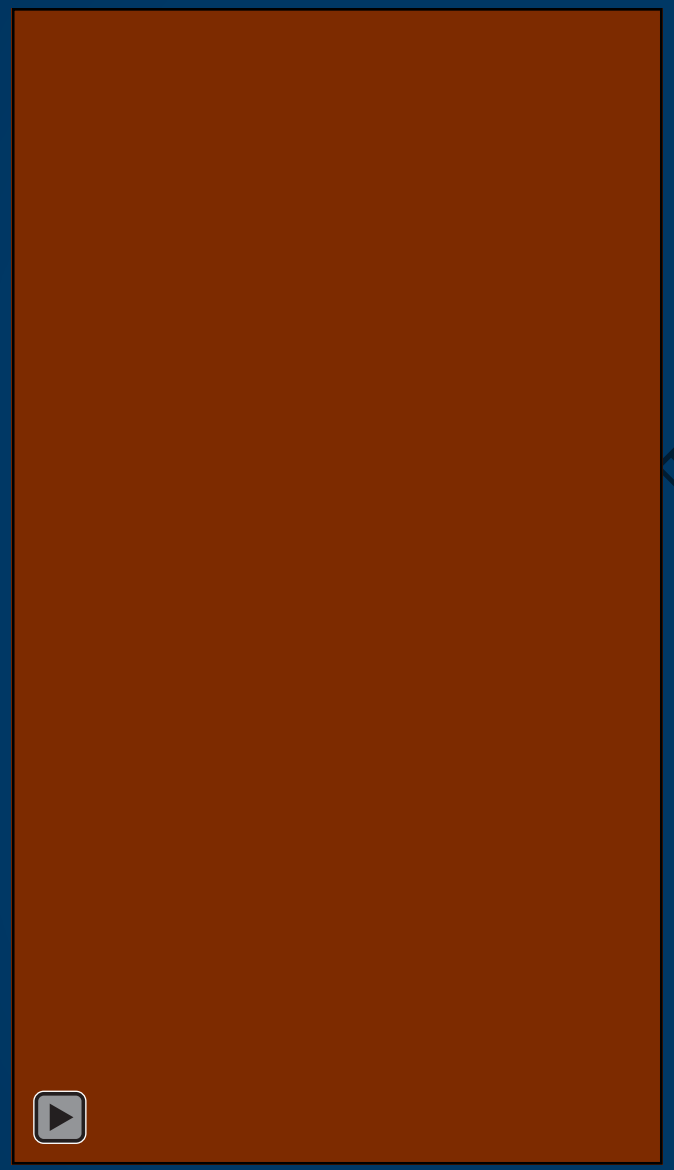
For SI units: 1 inch = 25.4 mm

Air Gap, Drainage. The unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe, plumbing fixture, appliance, or appurtenance conveying waste to the flood-level rim of the receptor.

Property of DLI
Use for Educational Reference Only



Plumbing Inspection



813.0 Swimming Pools.

813.1 General. *Pipes carrying wastewater from swimming or wading pools, including pool drainage and backwash from filters, water from scum gutter drains and pool deck drains, shall be installed as an indirect waste. Pool deck drains need not be trapped and vented per section 803.1. Pool deck drain piping must be pitched at a minimum of ⅛ inch per foot for pipe sizes 3 inches and larger. Where a pump is used to discharge waste pool water to the drainage system, the pump discharge shall be installed as an indirect waste.*

Property of DLI
Educational Reference Only

Plumbing Inspection

- Check traps

TABLE 1002.2
HORIZONTAL LENGTHS OF TRAP ARMS
(EXCEPT FOR WATER CLOSETS AND SIMILAR FIXTURES)[1, 2]

TRAP ARM PIPE DIAMETER (inches)	DISTANCE TRAP TO VENT MINIMUM (inches)	LENGTH MAXIMUM (inches)
1¼	2½	30
1½	3	42
2	4	60
3	6	72
4	8	120
Exceeding 4	2 x Diameter	120

For SI units: 1 inch = 25.4 mm

Notes:

1 Maintain ¼ inch per foot slope (20.8 mm/m).

2 The developed length between the trap of a water closet or similar fixture (measured from the top of the closet flange to the inner edge of the vent) and its vent shall not exceed 6 feet (1829 mm).

Property of DLI
Use for Educational Reference Only

Plumbing Inspection

- 1001.0 Traps Required

Property of DLI
Use for Educational Reference Only

  - 1001.1 Where Required. Each plumbing fixture, shall be separately trapped by an approved type of liquid seal trap.
  - Not more than one trap shall be permitted on a trap arm.

Plumbing Inspection

1001.2 Where Required. *Each plumbing fixture shall be separately trapped by an approved type of liquid seal trap. This section shall not apply to fixtures with integral traps. Not more than one trap shall be permitted on a trap arm. Food waste disposal units installed with a set of restaurant, commercial, or industrial sinks shall be connected to a separate trap. Each domestic clothes washer and each laundry tub shall be connected to a separate and independent trap, except that a laundry tub shall be permitted to also receive the waste from a clothes washer set adjacent thereto. The vertical distance between a fixture outlet and the trap weir shall be as short as practicable, but in no case shall the tailpiece from a fixture exceed 24 inches (610 mm) in length. One trap shall be permitted to serve a set of not more than three single compartment sinks or laundry tubs of the same depth or three lavatories immediately adjacent to each other and in the same room where the waste outlets are not more than 30 inches (762 mm) apart and the trap is centrally located where the three compartments are installed.*



Use for Educational Reference Only Property of DLI

1003.3 Size. The size (nominal diameter) of a trap for a given fixture shall be sufficient to drain the fixture rapidly but in no case less than nor more than one pipe size larger than given in Table 702.1. The trap shall be the same size as the trap arm to which it is connected.

Plumbing Inspection

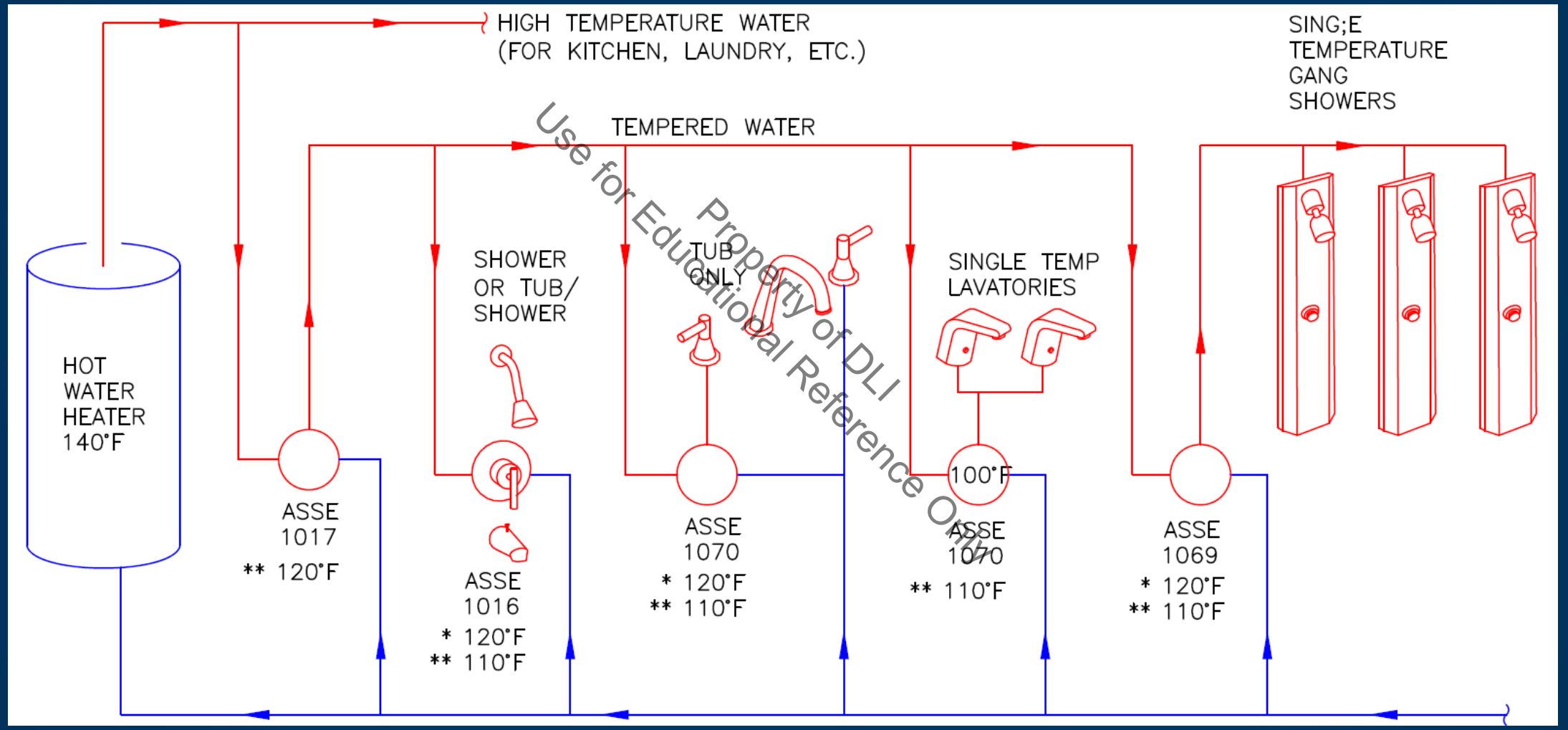
Chapter 4 and Scald Protection

- 409.4 Limitation of Hot Water in Bathtubs and Whirlpool Bathtubs. Maximum hot water temperature from a bathtub and/or whirlpool tub filler shall be limited to 120°F by a device that is in accordance with ASSE 1070 or CSA B125.3.
- 410.3 and 421.2 Limitations. The water temperatures for bidets and public lavatories must also be limited by a device with the same standard set to no more than 110°F.

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Plumbing Inspection



Plumbing Inspection

905.4 Roof Termination. Vent pipes shall extend undiminished in size above the roof, or shall be reconnected with soil or waste vent of the proper size.

906.7 Frost or Snow Closure. *Vent terminals shall be not less than 2 inches (50 mm) in diameter and shall not be smaller than the required vent pipe. Any change in diameter shall be made inside the building not less than 12 inches (305 mm) below the roof in an insulated space and terminate not less than 12 inches (305 mm) above the roof.*





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Plumbing Inspection



Continuous Waste (Kitchen Sinks/Laundry Tubs)

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Plumbing Inspection

402.2 Joints. Where a fixture comes in contact with the wall or floor, the joint between the fixture and the wall or floor shall be made watertight.

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- Ensure all fixtures are caulked and secure.
- Manometer has held
- Backflow addressed
- Water heater installed to code
- Water hammer addressed
- Softener air gap
- Bacteria Test results (New water install)

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Steps to finding Plumbing illustrations on MN DLI website

- **Step 1:** go to **dli.mn.gov**

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DEPARTMENT OF LABOR AND INDUSTRY

DIRECTIONS CONTACT US

ABOUT THE DEPARTMENT FOR BUSINESS FOR WORKERS



MAKE A PAYMENT | APPLY FOR OR RENEW A LICENSE | GET A PERMIT | CHECK A LICENSE OR REGISTRATION



SINESSES ▶



FOR WORKERS AND THE PUBLIC ▶



SAFETY AND HEALTH AT WORK ▶



WORKERS' COMPENSATION ▶



MINNESOTA STATE BUILDING CODES

The 2020 Minnesota State Building Code is in effect. View more information.

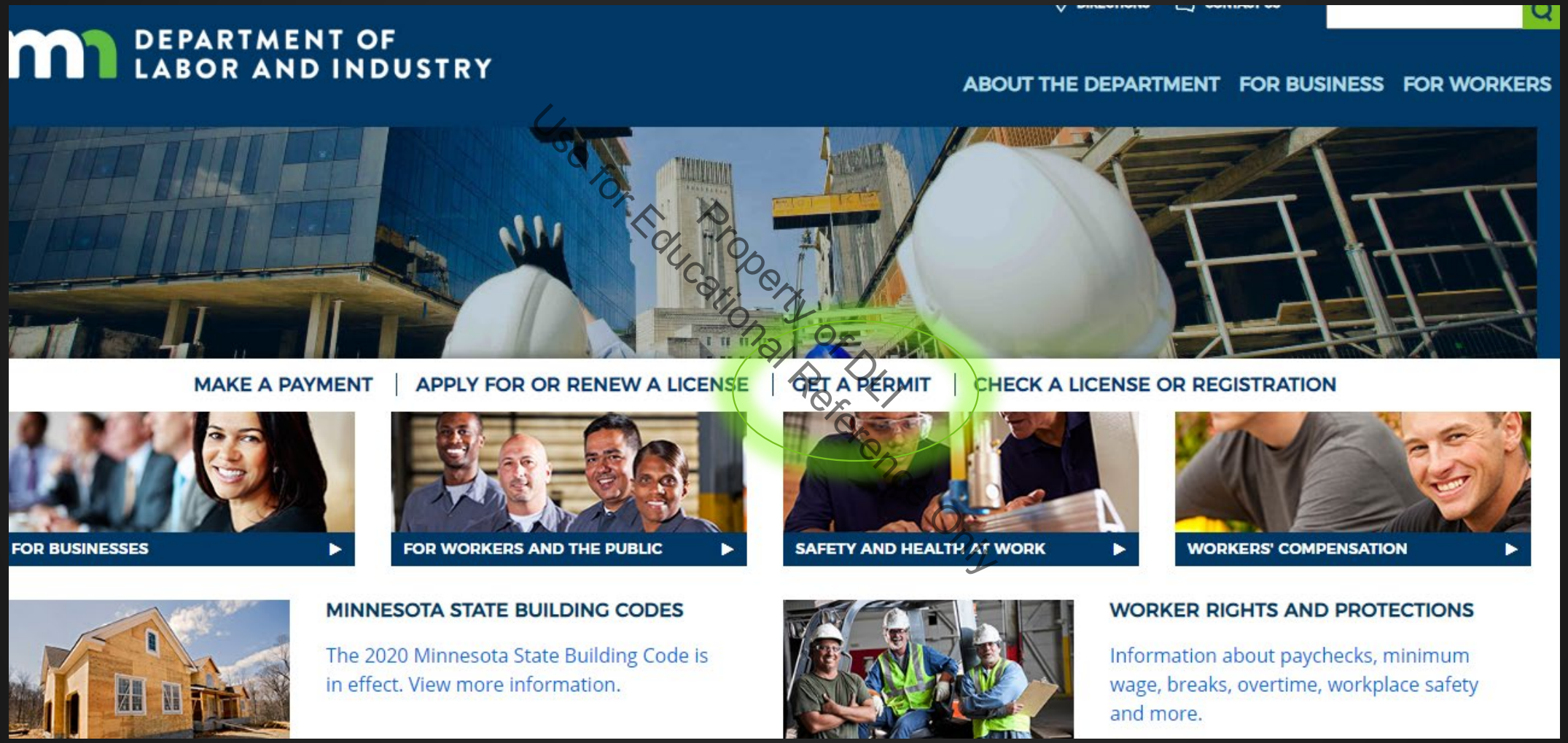


WORKER RIGHTS AND PROTECTIONS

Information about paychecks, minimum wage, breaks, overtime, workplace safety and more.

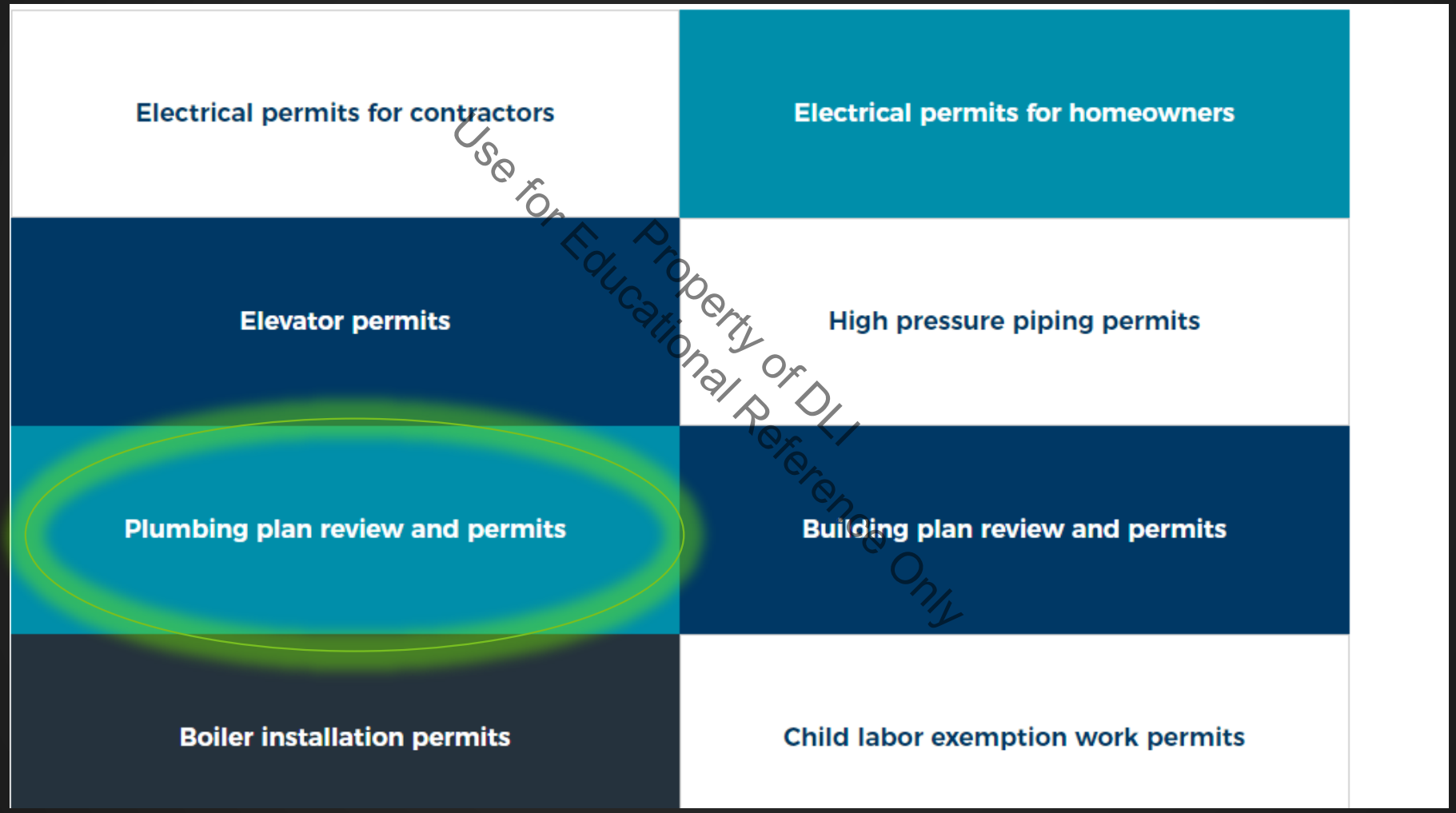
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Step 2: Click on: GET A PERMIT



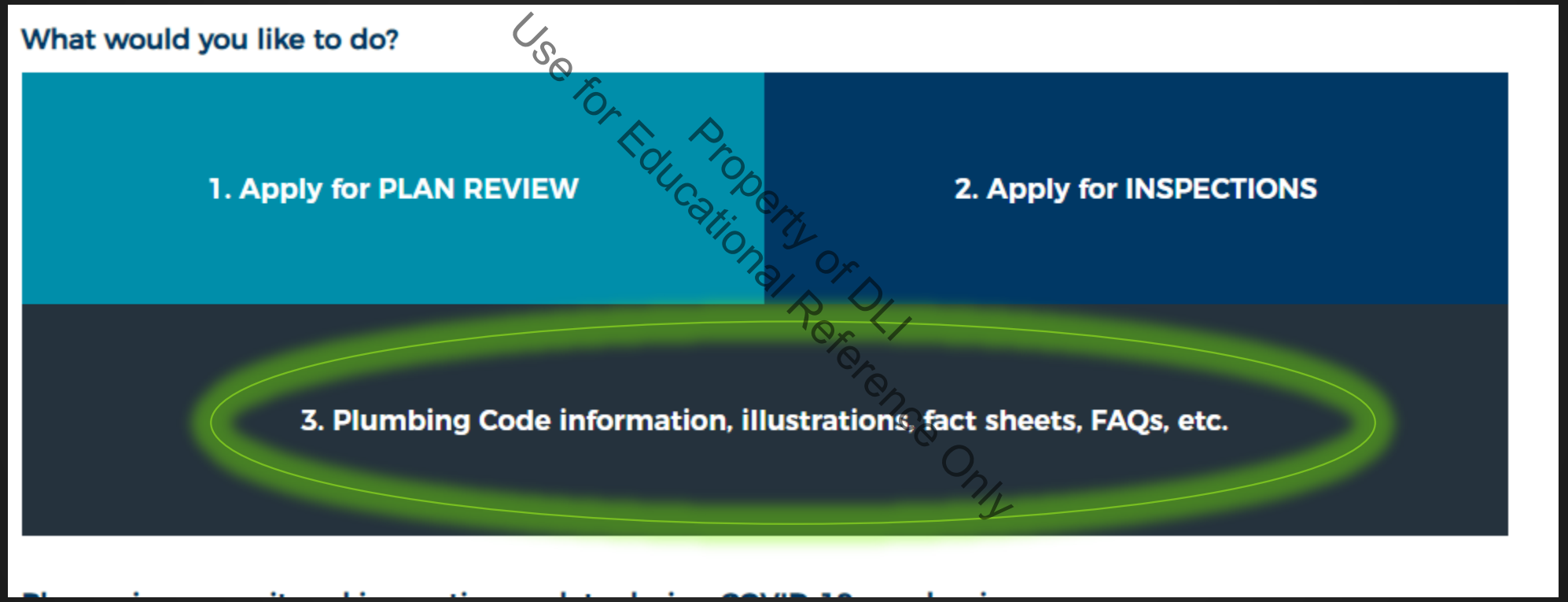
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Step 3: Click on Plumbing plan review and permits



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Step 4: Click on #3 Plumbing Code information…



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Step 5: Scroll down to Drawings, illustrations…

Code book

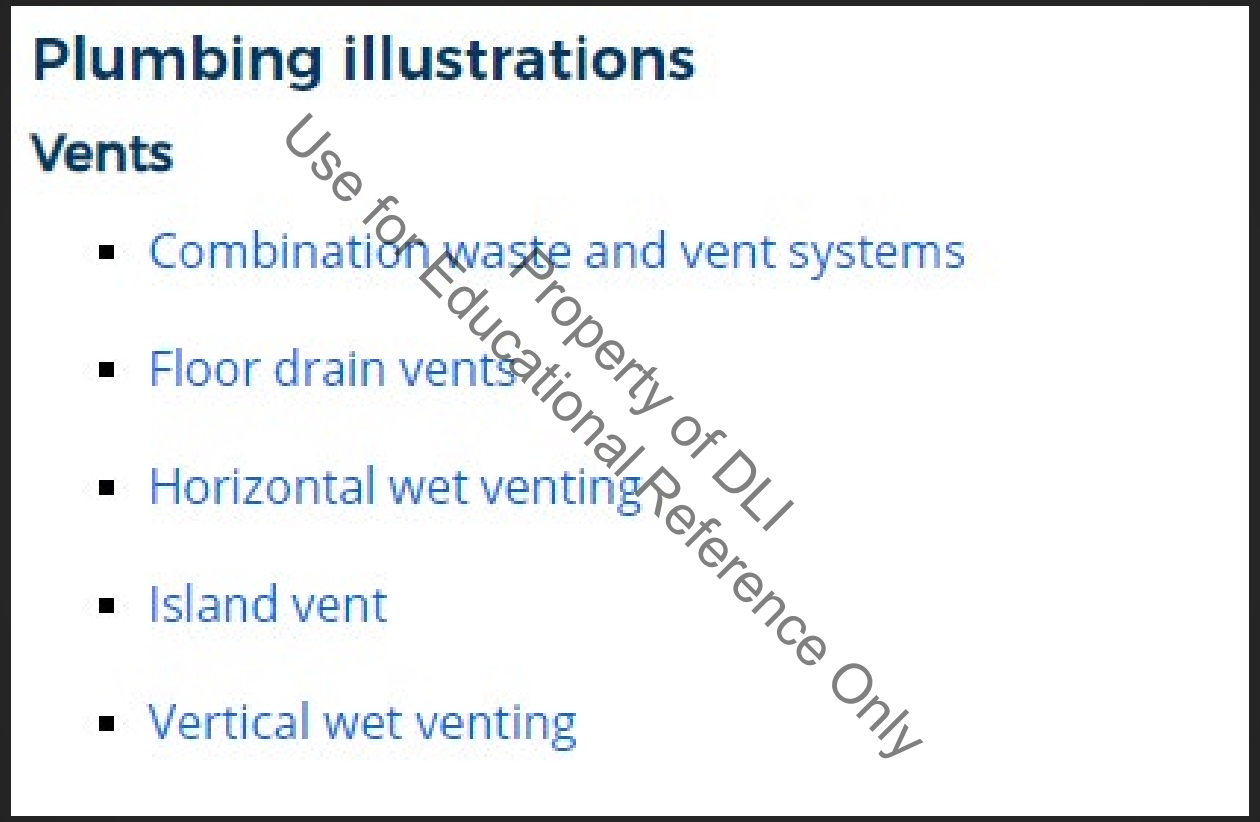
The 2020 Minnesota Plumbing Code is published by the International Association of the Plumbing and Mechanical Officials (IAPMO) for Minnesota in a single, reformatted custom code book. It incorporates Minnesota amendments and reads as a unified code book. It also includes Chapter 4716, Plumber Licensing and Apprentice Registration, and Chapter 1300, Minnesota Administration Code.

- 2020 Minnesota Plumbing Code free online viewing
- Plumbing Code Fact Sheet
- Frequently asked questions (FAQs)
- Drawings, illustrations and information sheets
- Fact Sheet: Requirements for Oil and Flammable Interceptors

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Scroll down to Plumbing illustrations

There are numerous ones.



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And More…

Kitchen items

- Dishwasher
- Hydromechanical grease interceptors
- Indirect waste
- Smoothie rinser
- Tell-tale floor drains:
  - General
  - Three-compartment sink
  - Four-compartment sink
  - Prep sink

Sand/flammable interceptors

- Unrated oil and flammable liquid interceptor
- Sand interceptors for motor vehicle wash facilities
- Sand interceptors

Other illustrations

- Chemical dispenser
- Cleanouts
- Elevator
- Plastic pipe installation - expansion

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How to Check a Plumbing License



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LICENSE AND REGISTRATION LOOKUP

Check licenses, bonds, certifications and registrations

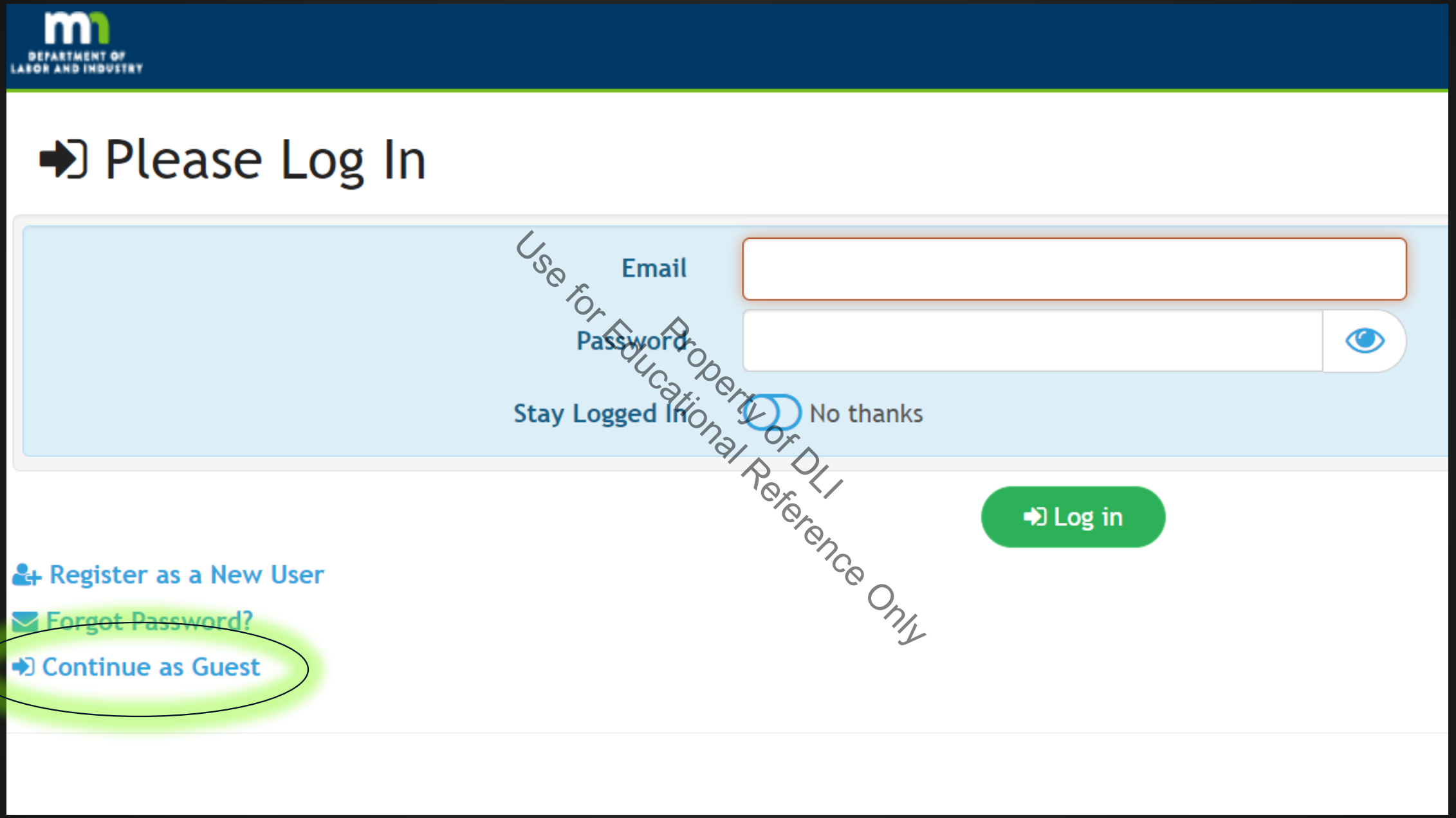
Visit iMS, our licensing management system, to check the status of a license, continuing education completion, work experience, plumbing bond holders and whether there are enforcement actions against a license.

- **An account is not required to search.** Select "Continue as guest" and enter a complete license or registration number into the search box at the top of the page.
- You can search using additional criteria by selecting the "Search License/Registration holders" button.
- View more information about searching in iMS.

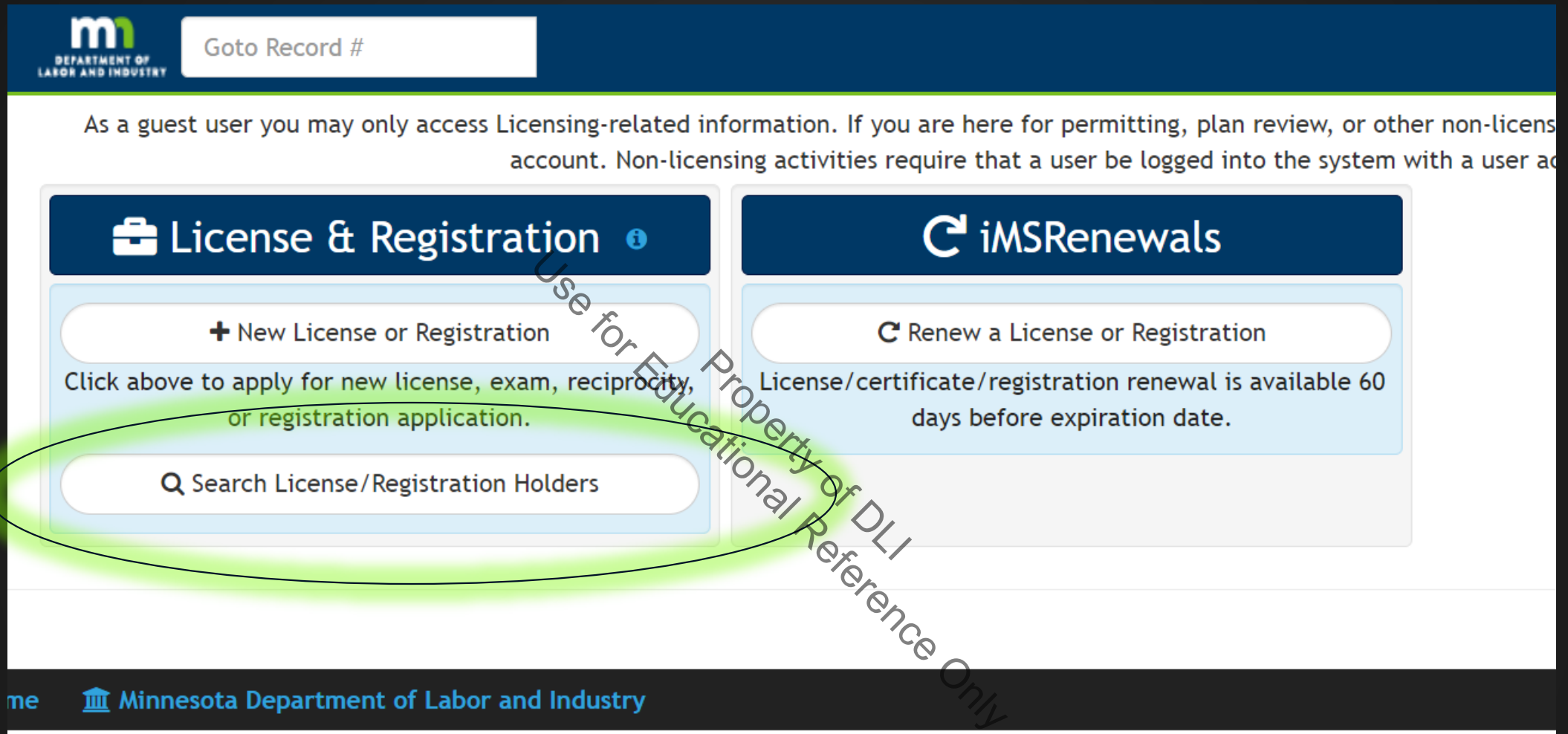
Download license, bond, certification and registration data

Download a spreadsheet of all licensed businesses and individuals. This export file includes all licenses, bonds, certifications and registrations that are issued by the Code Construction and Licensing Division of DLI. The file is updated nightly and can be sorted and filtered as needed.

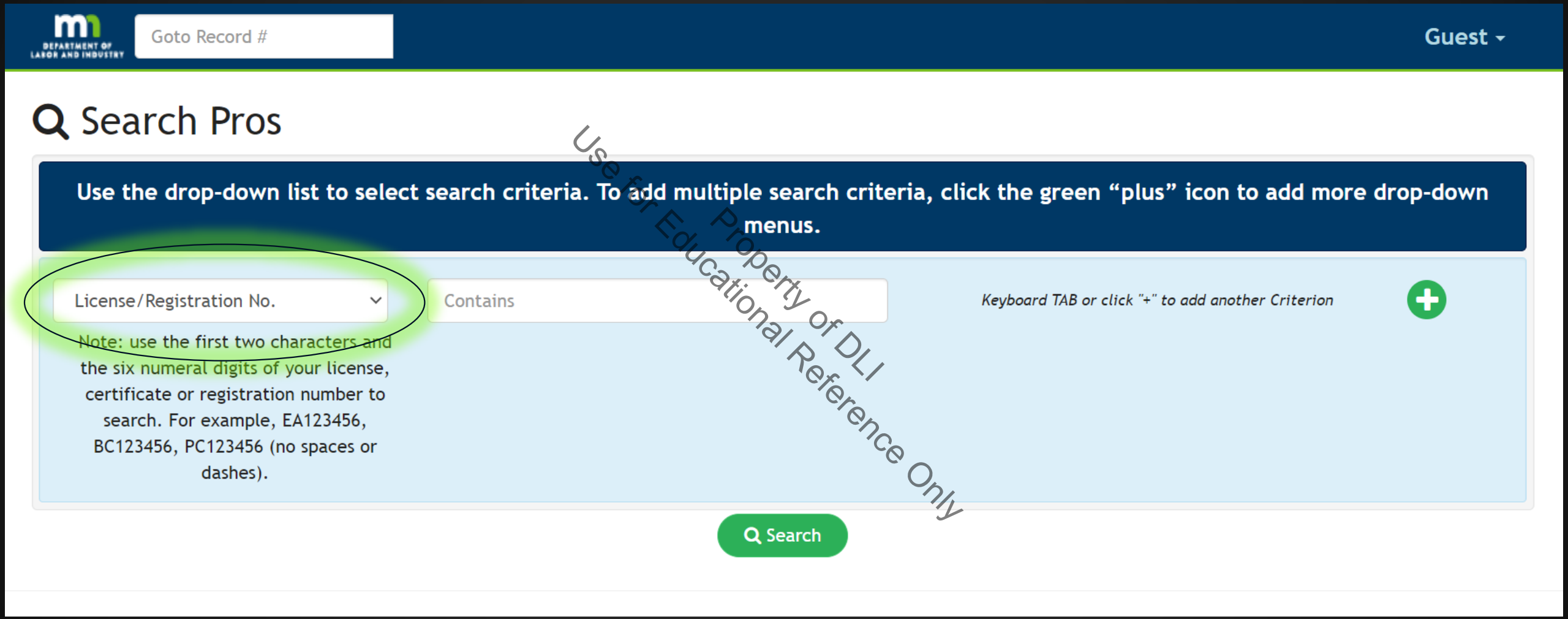
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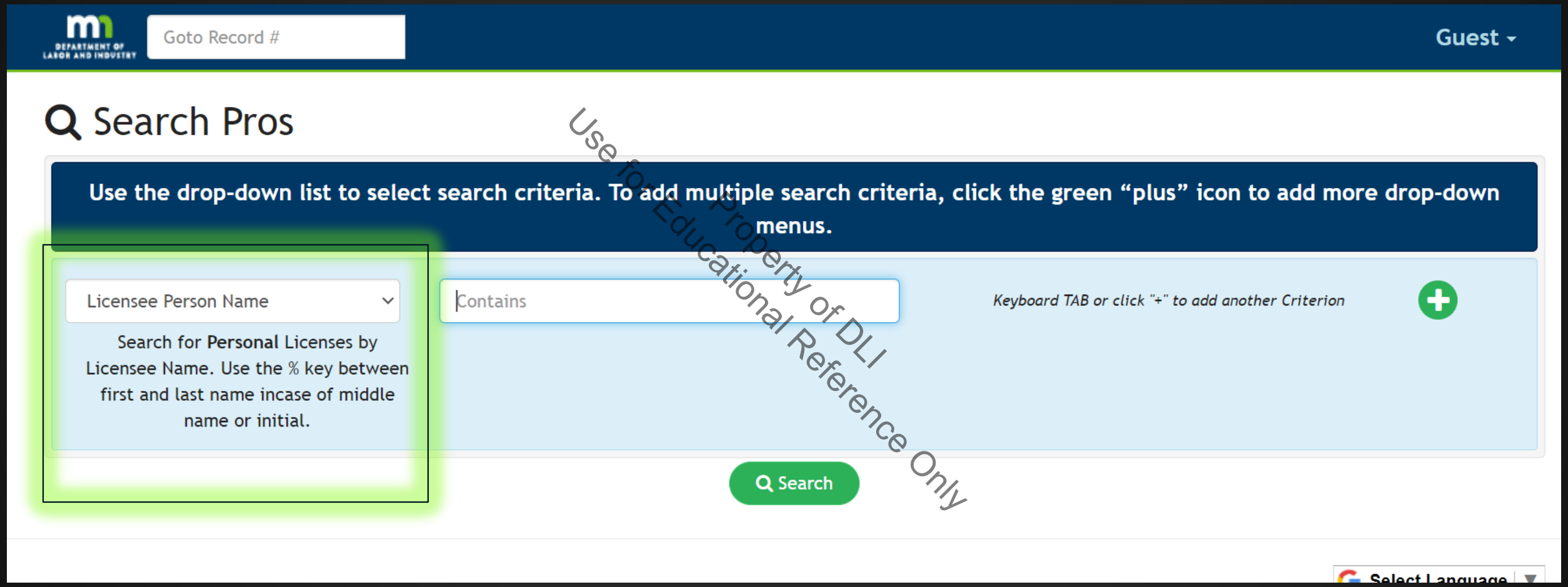
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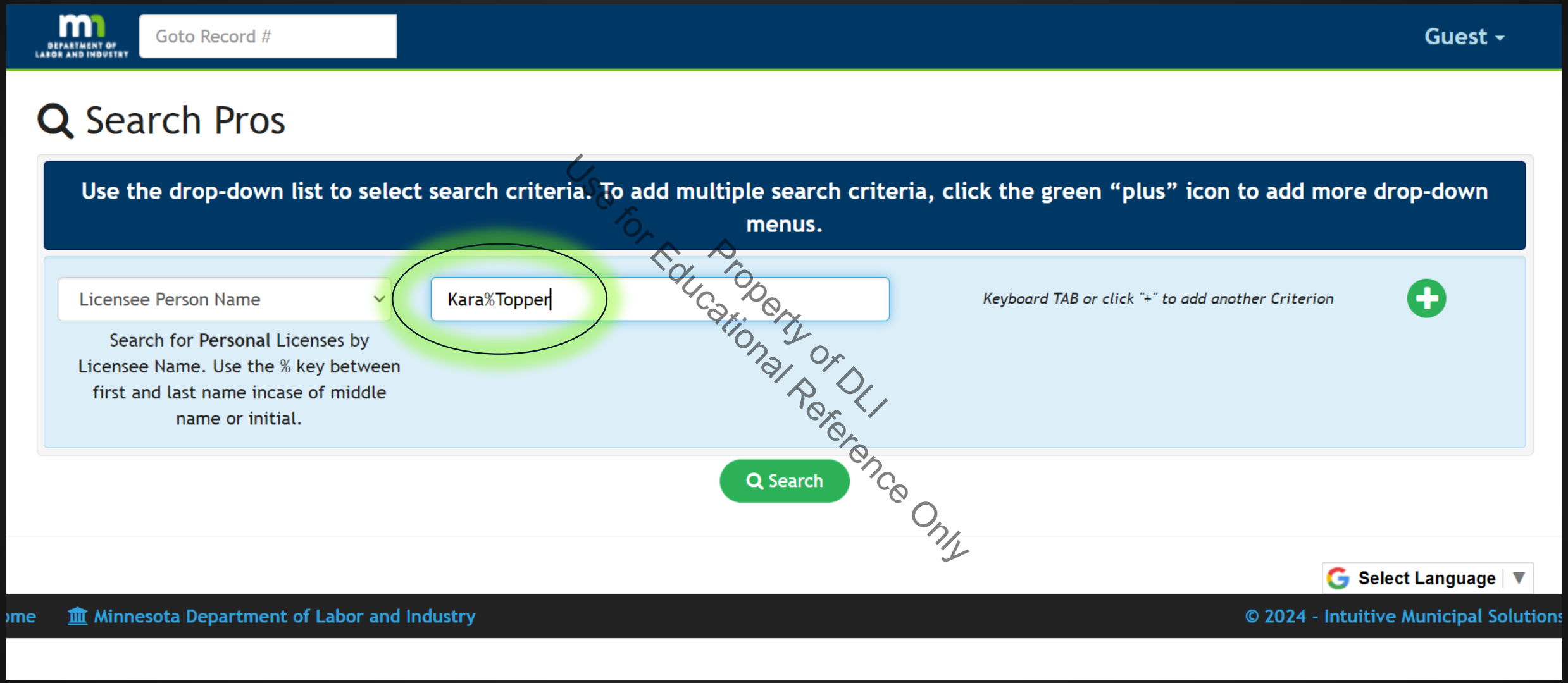
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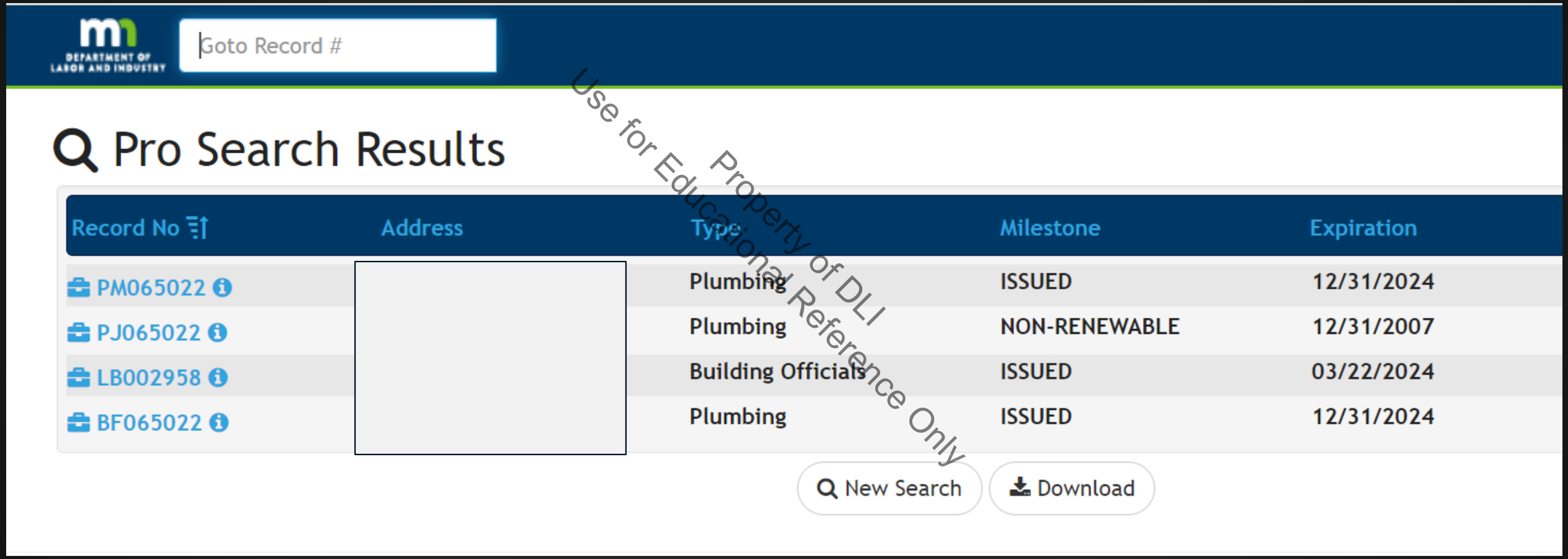
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Thank You!

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Kara Topper