Massachusetts Department of Environmental Protection
GUIDANCE FOR THE APPROVAL OF MOLDERING PRIVIES AT
EXISTING HIKE-IN/PADDLE-IN CAMPSITES

Issue Statement

Hiking in New England is a popular activity and there are numerous trails for hikers to use. The people who oversee and utilize these trails are working to improve the human sanitary waste disposal facilities on hike-in/paddle-in trails in an effort to reduce environmental and public health risks. In order to improve sanitary conditions at existing hike-in/paddle-in overnight campsites, the Massachusetts Department of Environmental Protection (MassDEP), along with the Appalachian Mountain Club (AMC) and MassDEP's Title 5/Groundwater Discharge Regulatory Review Stakeholder Group, has developed this Guidance for upgrading nonconforming pit privies and concentrated areas of cat holes at existing sites with nonconforming moldering privies.

The Appalachian Trail Conservancy's (ATC) Backcountry Sanitation Manual [2nd Edition, 2014] states that resolving problems of backcountry sanitation is a continuing challenge: "Improper disposal of wastes at heavily used remote recreation sites causes pollution of soil, groundwater and surface waters…" Human fecal waste at existing backcountry sites without moldering privies is usually deposited in the soil in pit toilets or cat holes or sometimes left uncontained on the ground surface. A moldering privy is an alternative type of backcountry outhouse that reduces the likelihood of human contact with wastes, and promotes aerobic conditions allowing for faster breakdown of wastes and less potential for groundwater contamination. Pit toilets are larger trenches dug in the ground by site managers to collect human wastes. Cat holes are smaller, created by users for one-time use (about 6 inches deep) and are covered with soil after use. Pits dug in areas with seasonal high water tables may be filled with water for a portion of the year. This results in anaerobic conditions which lead to the propagation of pathogens and groundwater contamination.

The anaerobic breakdown of waste in pits is slow and pathogens may remain viable for years. The waste in poorly located pit toilets proximate to surface water resources or high groundwater can leach contaminants into the surrounding area for years after use has ended. Cat holes are often dug by individuals without consideration of proximity to surface water and groundwater. As a result, anaerobic decomposition of wastes is not optimized. Studies have shown that human pathogens can remain viable for up to two years in cat holes (http://www.jswconline.org/content/37/6/357.abstract, Temple, Camper, and Lucas. 1982. Potential health hazards from human waste disposal in wilderness. *Journal of Soil and Water Conservation* 37(6):357-359). Uncontained waste on the ground surface creates an imminent health hazard and the potential for contaminant runoff.

The moldering privy was designed and approved by the U.S. Forest Service and is used on the Green and White Mountain National Forests. The National Park Service has also approved moldering privies on the Appalachian Trail and throughout the National Park System. The basic design of a moldering privy consists of a conventional outhouse on a mesh-enclosed, above-ground box foundation with airflow, also known as a cribbed foundation. The crib for the privy sits above a shallow depression (a few inches deep) that allows liquids to percolate into the biologically active layer of soil directly below the waste pile. Decomposition and treatment of the waste pile occurs through the slow collection of waste. Moldering privies are designed for locations that are remote, do not have plumbed water and are only accessible by hiking or paddling (inaccessible by vehicle). These sites may have tent platforms (a raised open deck for placement of a tent), shelters (a 3-sided structure with a roof), or a rustic cabin (4 walls and a roof). All of these sites are for transient use, with many sites limiting the number of nights a hiker can stay.

Moldering privies are based on a principle of continuous, cold (between 40°F and 100°F) composting. They are suitable for situations when the waste is added too slowly to reach higher temperatures. The majority of liquid that enters the pile is dried out before it reaches the ground through aerobic composting activity. The liquid that does enter the ground below the cribbed foundation enters the organic soil surface, is absorbed, and does not travel beyond the footprint of the outhouse. Organic soil is adequate to absorb the relatively low volumes of liquid deposited in these waterless toilets. A bulking agent is added to the pile with use to improve the porosity of the pile and prevent anaerobic conditions. Some sites use worms to assist with composting. When the waste is fully composted, it is disposed of in an area away from water sources and the campsites.

Moldering privies do not meet the definitions in the current Title 5 regulations at 310 CMR 15.002 for an on-site subsurface sewage disposal system, privy, or humus/composting toilet. Moldering privies are similar to humus/composting toilets, but discharge small amounts of liquid waste to the ground surface. 310 CMR 15.002 defines composting toilets as self-contained systems “consisting of a composter with a separate toilet fixture from which no liquid or solid waste materials are discharged to the surface or subsurface environment and from which a humus/compost like end product is produced.” Due to the fact that moldering privies discharge waste to the surface of the ground in the sequestered cribbing, they do not meet the definition of humus/composting toilets and therefore cannot be authorized under the Composting Toilet General Use Certification established by 310 CMR 15.289.

Maximum Feasible Compliance

Title 5 at 310 CMR 15.404(1) establishes goals for full compliance where feasible. An upgraded system in full compliance with Title 5 as contemplated by 15.404(1)(a) is not feasible for remote backcountry locations for the following reasons:

- The locations are inaccessible by vehicles necessary for the construction and maintenance of a Title 5 septic system;
- These locations do not have plumbed water available which is required for a Title 5 system;
- The locations would likely not accommodate a full Title 5 system; the use of an innovative/alternative system in accordance with 15.404(1)(b) is also not feasible due to the siting, construction, operation, maintenance, inspection and sampling requirements applied to these systems;
- The use of a Recirculating Sand Filter (RSF) system pursuant to 15.404(1)(c) designed for systems in a nitrogen sensitive area (NSA) with flows of 2000 gallons per day or greater will not be required because these sites will not be located in NSAs nor will the sites achieve such flows based on the limited number of visitors per week;
- A shared system could not be used (15.404(1)(d)) for the same reasons that a fully compliant septic system cannot be used and because there is only one "facility" associated with these sites; and
- A sewer system connection (15.404(1)(e)) is not feasible because sewers are not available in these locations.

The provisions of 310 CMR 15.404(2) which allow replacement or repair of a system component are inapplicable because the current cat holes and privies do not have any of the usual system components – e.g., septic tanks, distribution boxes, soil absorption systems, piping, or building sewers.

However, an approval pathway for these systems is available through upgrade approvals pursuant to 310 CMR 15.401 – 310 CMR 15.405.

310 CMR 15.402(1) provides that Local Upgrade Approvals (LUAs) may be granted by Local Approving Authorities (LAAs) without review by the Department for voluntary upgrade of nonconforming systems in accordance with the terms and provisions of 310 CMR 15.402 through 15.405. A nonconforming system is defined as one that is not in full compliance with the standards and requirements of Title 5, and includes, but is not limited to, cesspools and privies. 310 CMR 15.403(1) provides that the owner or operator may upgrade a failed or nonconforming system pursuant to a local upgrade approval in accordance with the standards and requirements of 310 CMR 15.404 and 15.405 without obtaining variances.

310 CMR 15.404(3) provides that a LAA may issue a LUA authorizing upgrade of a system with the goal of maximizing protection of public health, safety, welfare and the environment to the maximum extent feasible when full compliance is not feasible. However, this provision prohibits varying the following requirements in the manner stated within 310 CMR 15.404(3)(a) – (e): septic tank capacity; separation between a soil absorption system (SAS) and the high groundwater elevation; a minimum amount of naturally occurring pervious soil below the SAS

and reserve area; minimum SAS sizing requirements; and minimum setbacks between a SAS and surface water supplies and their tributaries, or private water supply wells. These provisions are all inapplicable to moldering privies which do not utilize a septic tank or SAS.

The remote and inaccessible location of these sites renders the goal of full compliance physically impossible and economically infeasible. In conformance with the third and fourth sentences of 310 CMR 15.405(1), LUAs issued for the upgrade of existing back country pit toilets or cat holes by replacement with moldering privies should include a finding that moldering privies are the best feasible upgrade and have the least effect on public health, safety, welfare and the environment because they will provide increased protection for water resources and improved treatment of sanitary sewage. Requirements for separation between the bottom of the shallow depression below the privy crib and high groundwater elevation, a minimum amount of naturally occurring pervious soil below the shallow depression, and appropriate setbacks from sensitive receptors including drinking water resources should be incorporated.

The Department will presume that LUAs are consistent with the requirements of Title 5 if they include the following:

Guidelines for siting of Moldering Privies:

Existing sites will be evaluated by representatives of the trail's hiking association and land managers to determine if moldering privies are the best feasible upgrade and will have the least effect on public health, safety, welfare and the environment because they will provide increased protection for water resources and improved treatment of sanitary sewage , or whether there is a better option that can be utilized. Each site should meet the following conditions:

Backcountry hike-in/paddle-in only overnight sites – Existing sites that are only accessible via hiking or paddling, where there is no vehicle access and no plumbing is available. Sites may have structures such as tent platforms (a raised open deck for placement of a tent), shelters (a 3-sided structure with a roof), or a rustic cabin (4 walls and a roof).

The moldering privy has been determined to be the best alternative to handle sanitary waste at the site based on its level of use. Per the ATC Backcountry Sanitation Manual, moldering privies are generally used at sites with less than 500 hikers per season but can be used at higher-use sites by constructing additional cribs to accommodate use and storage.

Siting and construction of the moldering privy should be on a dry, level site not vulnerable to flooding and should follow the detailed specifications in Section 8 of the ATC Backcountry Sanitation Manual (https://appalachiantrail.org/wp-content/uploads/2020/05/backcountry-sanitation-manual-2-0-august-2014.pdf).

Notwithstanding the provisions of 15.405(1), the setback distances for a Moldering Privy should comply with the provisions of 15.211(1) for a Soil Absorption System.

There should be four feet of separation between the bottom of the shallow depression below the privy crib and the high groundwater elevation at the site.

Cribs should be sized to provide enough storage to accommodate trail use and composting needs. The goal is to have enough storage capacity to allow a long retention time for the waste in the crib, to ensure the greatest level of pathogen reduction.

Each moldering privy should have a minimum of two storage cribs to provide storage when one bin is full. Additional cribs should be added if the cribs are filling up in three years or less. (See pg. 56 ATC Backcountry Sanitation Manual.)

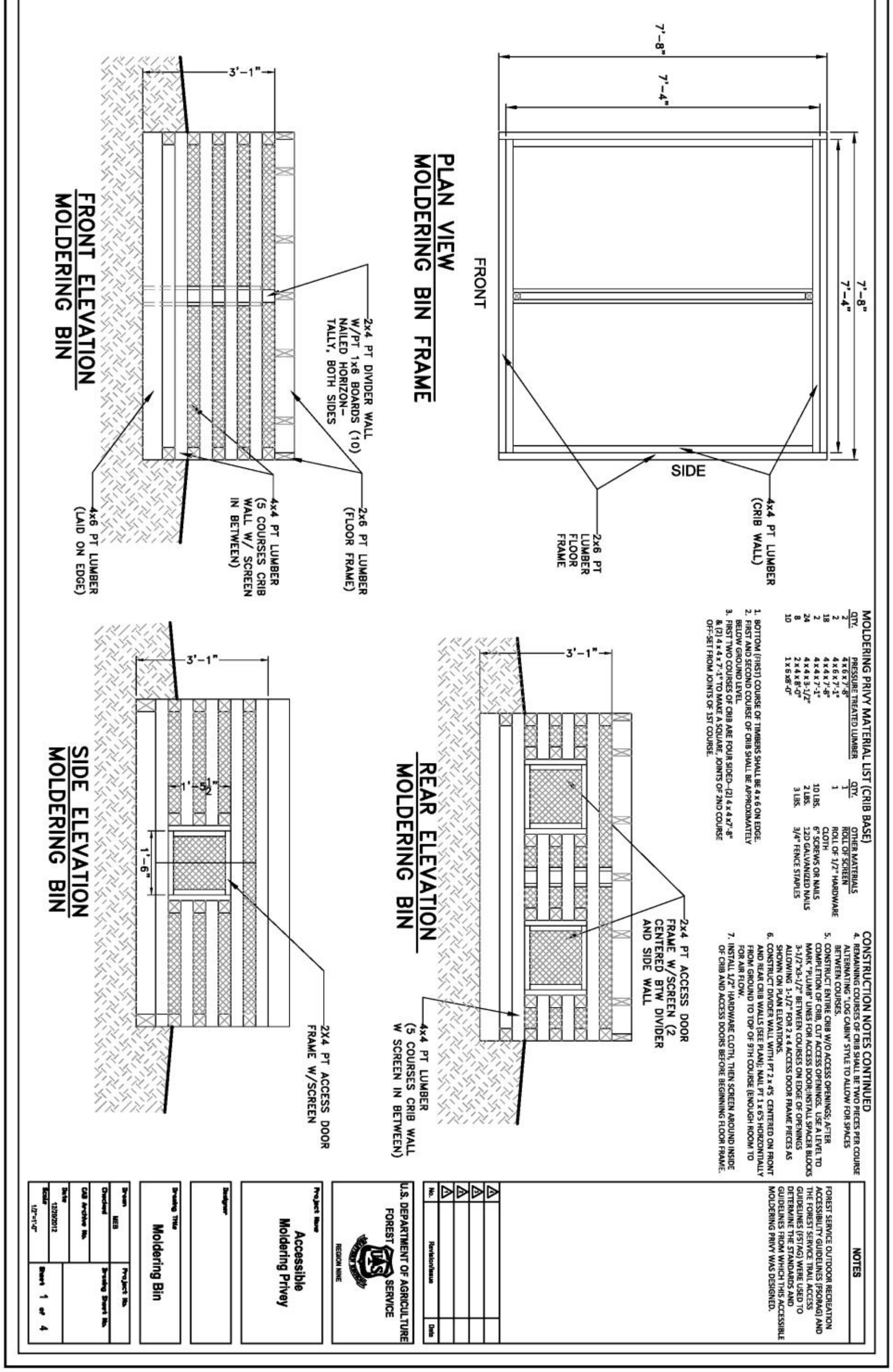
Composted solids should be disposed of in a manner approved by the LAA. The location of where the composted solids will be disposed of should be determined at the time of approval. If the composted solids are buried, they should be covered with a minimum of six inches of clean compacted earth Any change in the location or in the manner of disposal should obtain pre-approval by the LAA.

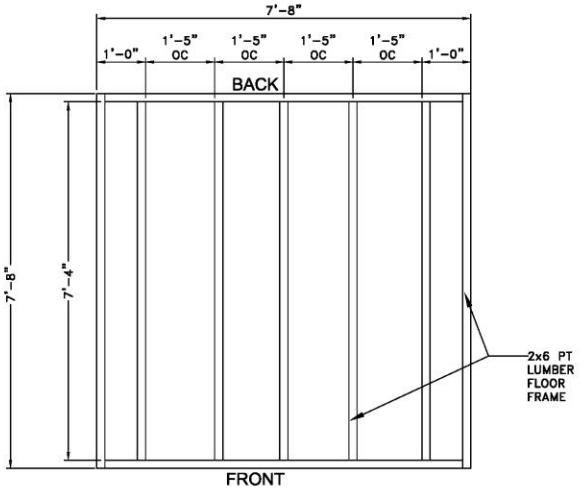
The construction of the moldering privy should be done in accordance with the ATC Backcountry Sanitation Manual specifications (United States Forest Service (USFS) design – see Appendix 1). Representatives of the trail's hiking association should submit written documentation to the LAA detailing and verifying the proper construction of the system. Any variations made during construction should be described, outlining the need for the variance and the solution.

The system should be maintained in accordance with ATC Backcountry Sanitation Manual specifications and a maintenance log should be maintained at the site.

Signage explaining proper use of the moldering privy should be posted on and within the structure.

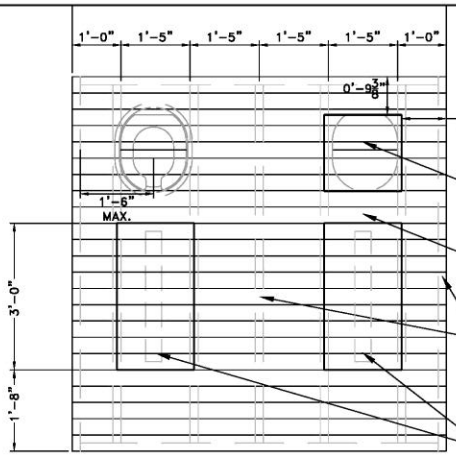
APPENDIX 1


7'-8"
7'-4"
4x4 PT LUMBER (CRIB WALL)
SIDE
2x6 PT LUMBER FLOOR FRAME
FRONT
PLAN VIEW
MOLDERING BIN FRAME
MOLDERING PRIVY MATERIAL LIST (CRIB BASE)
QTY. PRESSURE TREATED LUMBER
2 4 x 6 x 7'-8"
2 4 x 6 x 7'-1"
18 4 x 4 x 7'-8"
2 4 x 4 x 7'-1"
24 4 x 4 x 3-1/2"
8 2 x 4 x 8'-0"
10 1 x 6 x8'-0"
QTY. OTHER MATERIALS
1 ROLL OF SCREEN
1 ROLL OF 1/2" HARDWARE CLOTH
10 LBS. 6" SCREWS OR NAILS
2 LBS. 12D GALVANIZED NAILS
3 LBS. 3/4" FENCE STAPLES
1. BOTTOM (FIRST) COURSE OF TIMBERS SHALL BE 4 x 6 ON EDGE.
2. FIRST AND SECOND COURSE OF CRIB SHALL BE APPROXIMATELY BELOW GROUND LEVEL.
3. FIRST TWO COURSES OF CRIB ARE FOUR SIDED--(2) 4 x 4 x7'-8" & (2) 4 x 4 x 7'-1" TO MAKE A SQUARE, JOINTS OF 2ND COURSE OFF-SET FROM JOINTS OF 1ST COURSE.
CONSTRUCTION NOTES CONTINUED
4. REMAINING COURSES OF CRIB SHALL BE TWO PIECES PER COURSE ALTERNATING "LOG CABIN" STYLE TO ALLOW FOR SPACES BETWEEN COURSES.
5. CONSTRUCT ENTIRE CRIB W/O ACCESS OPENINGS; AFTER COMPLETION OF CRIB, CUT ACCESS OPENINGS. USE A LEVEL TO MARK "PLUMB" LINES FOR ACCESS DOOR;INSTALL SPACER BLOCKS 3-1/2"x3-1/2" BETWEEN COURSES ON EDGE OF OPENINGS ALLOWING 1-1/2" FOR 2 x 4 ACCESS DOOR FRAME PIECES AS SHOWN ON PLAN ELEVATIONS.
6. CONSTRUCT DIVIDER WALL WITH PT 2 x 4'S CENTERED ON FRONT AND REAR CRIB WALLS (SEE PLAN); NAIL PT 1 x 6'S HORZONTIALLY FROM GROUND TO TOP OF 9TH COURSE (ENOUGH ROOM TO FOR AIR FLOW.
7. INSTALL 1/2" HARDWARE CLOTH, THEN SCREEN AROUND INSIDE OF CRIB AND ACCESS DOORS BEFORE BEGINNING FLOOR FRAME.
NOTES
FOREST SERVICE OUTDOOR RECREATION ACCESSIBILITY GUIDELINES (FSORAG) AND THE FOREST SERVICE TRAIL ACCESS GUIDELINES (FSTAG) WERE USED TO DETERMINE THE STANDARDS AND GUIDELINES FROM WHICH THIS ACCESSIBLE MOLDERING PRIVY WAS DESIGNED.
2x4 PT ACCESS DOOR FRAME W/SCREEN (2 CENTERED BTW DIVIDER AND SIDE WALL
3'-1"
REAR ELEVATION
MOLDERING BIN
4x4 PT LUMBER (5 COURSES CRIB WALL W SCREEN IN BETWEEN)
2x4 PT DIVIDER WALL W/PT 1x6 BOARDS (10) NAILED HORIZON-TALLY, BOTH SIDES
2x6 PT LUMBER (FLOOR FRAME)
4x4 PT LUMBER (5 COURSES CRIB WALL W/ SCREEN IN BETWEEN)
4x6 PT LUMBER (LAID ON EDGE)
FRONT ELEVATION
MOLDERING BIN
2X4 PT ACCESS DOOR FRAME W/SCREEN
1'-5½"
1'-6"
SIDE ELEVATION
MOLDERING BIN
No. Revision/Issue Date
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION NINE
Project Name
Accessible Moldering Privey
Designer
Drawing Title
Moldering Bin
Drawn MEB
Checked
CAD Archive No.
Date 12/20/2012
Scale 1/2"=1'-0"
Project No.
Drawing Sheet No.
Sheet 1 of 4



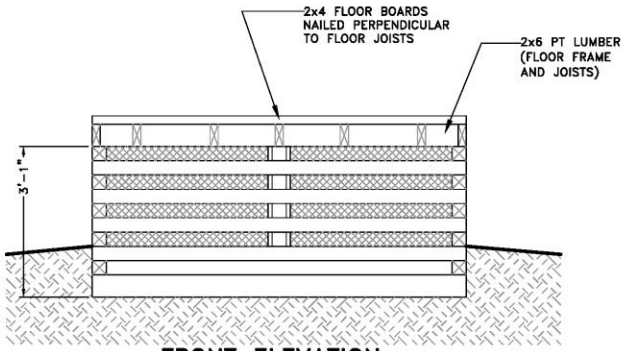
FRONT

PLAN VIEW
FLOOR FRAME



FRONT/BACK

PLAN VIEW
FLOOR FRAME



FRONT ELEVATION
FLOOR JOISTS & FRAME ON CRIB

MOLDERING PRIVY MATERIAL LIST (FLOOR FRAME AND FLOOR)

QTY.	ROUGH LUMBER
9	2 x 6 x 8'-0"
23	2 x 4 x 8'-0"

OTHER MATERIALS	
5 LBS.	16D GALVANIZED NAILS (FLOOR FRAME)
20 LBS.	16D GALVANIZED NAILS (FLOOR)

CONSTRUCTION NOTES

1. INSTALL 2 x 6 JOISTS PERPENDICULAR TO DIRECTION OF ENTRY AS SHOWN IN PLAN VIEW.
2. VERIFY DIMINSIONS OF TOILET RISER BEFORE CUTTING FLOORING. CENTER OF TOILET RISER SHALL BE 16"-18" MAX. MEASURED FROM EDGE OF INSIDE WALL. TOILET OPENING IN FLOOR SHALL BE CENTERED BETWEEN JOISTS.
3. INSTALL FLOOR BOARDS.
4. FLOOR HATCHES SHALL BE INSTALLED W/EDGES CENTERED ON JOISTS.

NOTES

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No.	Revision/Issue	Date
1		
2		
3		
4		

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION NINE

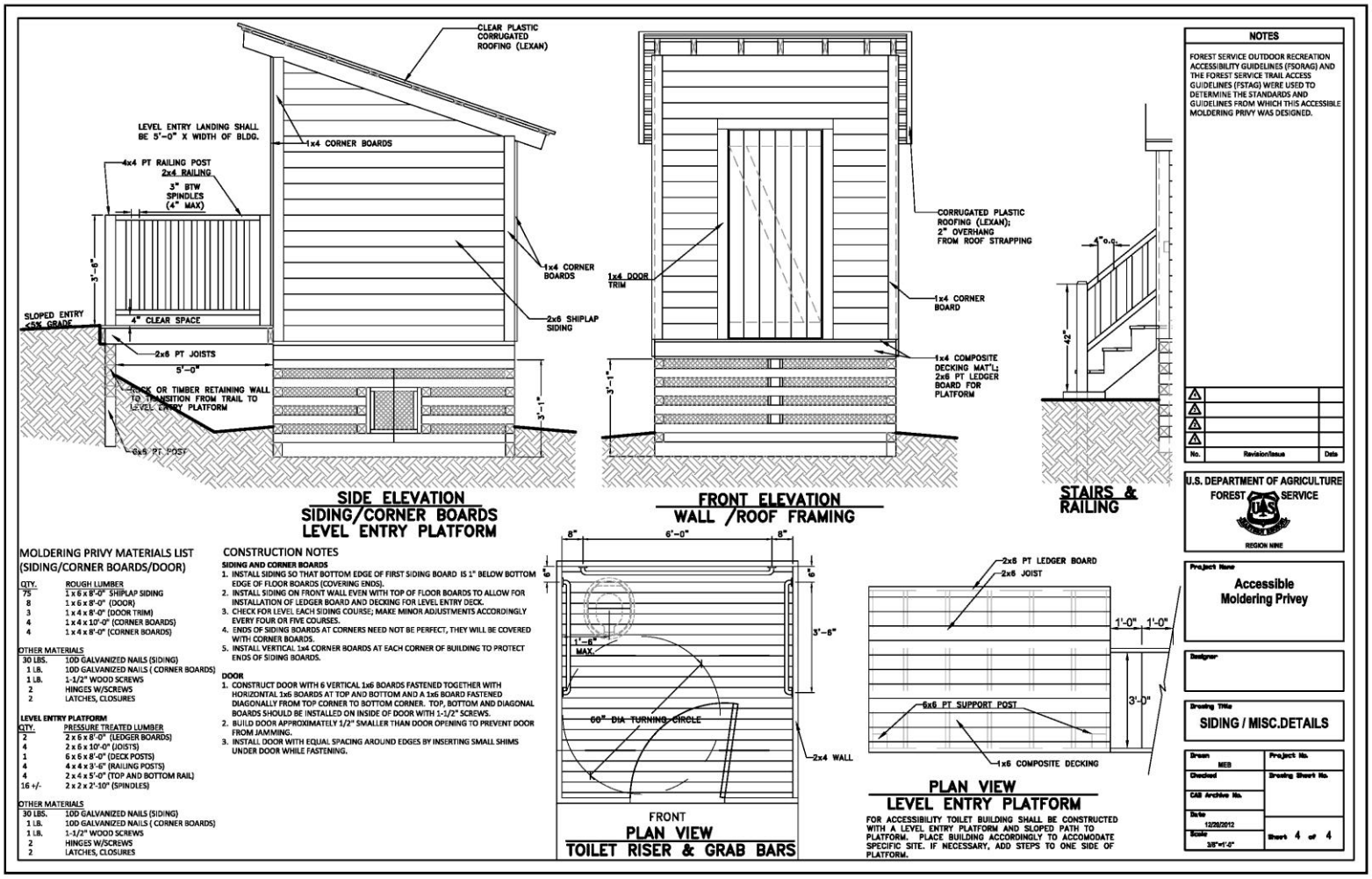
Project Name
Accessible Moldering Privey

Designer

Drawing Title
FLOOR FRAMING

Drawn MEB	Project No.
Checked	Drawing Sheet No.
CAD Archive No.	
Date 12/20/2012	
Scale 1/2"=1'-0"	Sheet 2 of 4

FRONT ELEVATION
WALL /ROOF FRAMING
SIDE ELEVATION
WALL/ROOF FRAMING
MOLDERING PRIVY MATERIALS LIST (WALL/ ROOF FRAMING)
CONSTRUCTION NOTES*
NOTES
2x6 ROOF RAFTERS
1x4 ROOF STRAPPING (8) EVENLY SPACED; 1" OVERHANG @RAFTER ENDS 4" OVERHAND ON SIDE WALLS
2x4 WALL STUDS
CORRUGATED PLASTIC ROOFING (LEXAN); 2" OVERHANG FROM ROOF STRAPPING
2x4 LUMBER (WALL PLATE)
2x4 LUMBER (FLOORING)
2x6 PT LUMBER
FRONT/BACK WALL BRACING
PLUMB CUT RAFTER TAILS ON FRONT WALL
2x4 BOTTOM WALL PLATE
2x6 ROOF RAFTER
2x4 TOP WALL PLATE
2x4 BLOCKING FOR GRAB BARS; SEE SHEET 4 OF 4 FOR LAYOUT DETAIL
2x4 BLOCKING FOR 4' GRAB BAR; SEE SHEET 4 OF 4 FOR LAYOUT DETAIL
U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Accessible Moldering Privy
WALL & ROOF FRAMING
Sheet 3 of 4


CLEAR PLASTIC CORRUGATED ROOFING (LEXAN)
LEVEL ENTRY LANDING SHALL BE 5'-0" X WIDTH OF BLDG.
1x4 CORNER BOARDS
4x4 PT RAILING POST
2x4 RAILING
3" BTW SPINDLES (4" MAX)
3'-6"
SLOPED ENTRY <5% GRADE
4" CLEAR SPACE
2x6 PT JOISTS
5'-0"
ROCK OR TIMBER RETAINING WALL TO TRANSITION FROM TRAIL TO LEVEL ENTRY PLATFORM
6x6 PT POST
3'-1"
1x4 CORNER BOARDS
2x6 SHIPLAP SIDING
SIDE ELEVATION
SIDING/CORNER BOARDS
LEVEL ENTRY PLATFORM
CORRUGATED PLASTIC ROOFING (LEXAN); 2" OVERHANG FROM ROOF STRAPPING
1x4 DOOR TRIM
1x4 CORNER BOARD
1x4 COMPOSITE DECKING MAT'L; 2x6 PT LEDGER BOARD FOR PLATFORM
3'-1"
FRONT ELEVATION
WALL /ROOF FRAMING
4" O.C.
42"
STAIRS & RAILING
MOLDERING PRIVY MATERIALS LIST
(SIDING/CORNER BOARDS/DOOR)
QTY. ROUGH LUMBER
75 1 x 6 x 8'-0" SHIPLAP SIDING
8 1 x 6 x 8'-0" (DOOR)
3 1 x 4 x 8'-0" (DOOR TRIM)
4 1 x 4 x 10'-0" (CORNER BOARDS)
4 1 x 4 x 8'-0" (CORNER BOARDS)
OTHER MATERIALS
30 LBS. 10D GALVANIZED NAILS (SIDING)
1 LB. 10D GALVANIZED NAILS (CORNER BOARDS)
1 LB. 1-1/2" WOOD SCREWS
2 HINGES W/SCREWS
2 LATCHES, CLOSURES
LEVEL ENTRY PLATFORM
QTY. PRESSURE TREATED LUMBER
2 2 x 6 x 8'-0" (LEDGER BOARDS)
4 2 x 6 x 10'-0" (JOISTS)
1 6 x 6 x 8'-0" (DECK POSTS)
4 4 x 4 x 3'-6" (RAILING POSTS)
4 2 x 4 x 5'-0" (TOP AND BOTTOM RAIL)
16 +/- 2 x 2 x 2'-10" (SPINDLES)
OTHER MATERIALS
30 LBS. 10D GALVANIZED NAILS (SIDING)
1 LB. 10D GALVANIZED NAILS (CORNER BOARDS)
1 LB. 1-1/2" WOOD SCREWS
2 HINGES W/SCREWS
2 LATCHES, CLOSURES
CONSTRUCTION NOTES
SIDING AND CORNER BOARDS
1. INSTALL SIDING SO THAT BOTTOM EDGE OF FIRST SIDING BOARD IS 1" BELOW BOTTOM EDGE OF FLOOR BOARDS (COVERING ENDS).
2. INSTALL SIDING ON FRONT WALL EVEN WITH TOP OF FLOOR BOARDS TO ALLOW FOR INSTALLATION OF LEDGER BOARD AND DECKING FOR LEVEL ENTRY DECK.
3. CHECK FOR LEVEL EACH SIDING COURSE; MAKE MINOR ADJUSTMENTS ACCORDINGLY EVERY FOUR OR FIVE COURSES.
4. ENDS OF SIDING BOARDS AT CORNERS NEED NOT BE PERFECT, THEY WILL BE COVERED WITH CORNER BOARDS.
5. INSTALL VERTICAL 1x4 CORNER BOARDS AT EACH CORNER OF BUILDING TO PROTECT ENDS OF SIDING BOARDS.
DOOR
1. CONSTRUCT DOOR WITH 6 VERTICAL 1x6 BOARDS FASTENED TOGETHER WITH HORIZONTAL 1x6 BOARDS AT TOP AND BOTTOM AND A 1x6 BOARD FASTENED DIAGONALLY FROM TOP CORNER TO BOTTOM CORNER. TOP, BOTTOM AND DIAGONAL BOARDS SHOULD BE INSTALLED ON INSIDE OF DOOR WITH 1-1/2" SCREWS.
2. BUILD DOOR APPROXIMATELY 1/2" SMALLER THAN DOOR OPENING TO PREVENT DOOR FROM JAMMING.
3. INSTALL DOOR WITH EQUAL SPACING AROUND EDGES BY INSERTING SMALL SHIMS UNDER DOOR WHILE FASTENING.
8"
6'-0"
8"
6"
1"
3'-6"
1'-6" MAX.
60" DIA TURNING CIRCLE
2x4 WALL
FRONT
PLAN VIEW
TOILET RISER & GRAB BARS
2x6 PT LEDGER BOARD
2x6 JOIST
1'-0"
1'-0"
3'-0"
6x6 PT SUPPORT POST
1x6 COMPOSITE DECKING
PLAN VIEW
LEVEL ENTRY PLATFORM
FOR ACCESSIBILITY TOILET BUILDING SHALL BE CONSTRUCTED WITH A LEVEL ENTRY PLATFORM AND SLOPED PATH TO PLATFORM. PLACE BUILDING ACCORDINGLY TO ACCOMODATE SPECIFIC SITE. IF NECESSARY, ADD STEPS TO ONE SIDE OF PLATFORM.
NOTES
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SIDING / MISC.DETAILS
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CAD Archive No.
Date 12/28/2012
Scale 3/8"=1'-0"
Project No.
Drawing Sheet No.
Sheet 4 of 4