

**SUPERSEDED BY EB 23-024
EFFECTIVE 8/3/23**



New York State
Department of
Transportation
**ENGINEERING
INSTRUCTION**

EI
08-021

Title: **SPECIAL SPECIFICATION FOR CRIB WALLS AND BIN WALLS**

Distribution:

- | | |
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| <input checked="" type="checkbox"/> Manufacturers (18) | <input type="checkbox"/> Surveyors (33) |
| <input checked="" type="checkbox"/> Local Govt. (31) | <input checked="" type="checkbox"/> Consultants (34) |
| <input checked="" type="checkbox"/> Agencies (32) | <input checked="" type="checkbox"/> Contractors (39) |
| | <input type="checkbox"/> _____ () |

Approved:

Robert L. Sack, P.E.
Deputy Chief Engineer (Research)

5-June-08
Date

ADMINISTRATIVE INFORMATION:

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of January 8, 2009.
- Superseded issuance(s): This EI does not supersede any previous issuances.
- Disposition of issued materials: The information transmitted by this issuance will reside in the Special Specifications directory of the Toolbox Server.

PURPOSE: The purpose of this EI is to issue new special specifications for precast concrete cribbing (stretcher & header type) retaining walls and metal bin-type retaining walls.

TECHNICAL INFORMATION:

- Revised Standard Specification Section 632 – Precast Modular Walls is being issued concurrently via EI 08-020.
- Revised Standard Sheets M632-1R1 and M632-2R1 are being issued concurrently via EB 08-020.
- Revisions to Chapter 9 of the Highway Design Manual are being issued concurrently via EI 08-019.
- To save the existing information in the Standard Specification and Standard Sheets for precast headers & stretchers and the metal bin-type retaining wall construction, the requirements and details were combined into a special specification.

TRANSMITTED MATERIALS:

- The following new Metric special specifications:

Item 632.0701--17	Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall.
Item 632.0702--17	Excavation for Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall.
Item 632.0703--17	Backfill for Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall.
Item 632.0801--17	Metal Bin-Type Retaining Wall.
Item 632.0802--17	Excavation for Metal Bin-Type Retaining Wall.
Item 632.0803--17	Backfill for Metal Bin-Type Retaining Wall.
- The following new US Customary special specifications:

Item 632.07010017	Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall.
Item 632.07020017	Excavation for Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall.
Item 632.07030017	Backfill for Precast Concrete Cribbing (Stretcher & Header Type)

Item 632.08010017
Item 632.08020017
Item 632.08030017

Retaining Wall.
Metal Bin-Type Retaining Wall.
Excavation for Metal Bin-Type Retaining Wall.
Backfill for Metal Bin-Type Retaining Wall.

BACKGROUND: Standard Specification Section 632 and Standard Sheets M632-1 thru 4 are outdated. The existing Standard Specification Section 632 provides a choice between precast headers & stretchers, precast concrete cribbing fabricated to conform to the shape and size shown on the Standard Sheets (Sta-Wall), or a metal bin-type retaining wall. The precast headers & stretchers and the metal bin-type retaining walls are no longer specified and only have a rare occasion for use by Maintenance Forces. The fabrication of the precast concrete cribbing wall (Sta-Wall) is waning as Precasters are being licensed by a system designer to produce a certain wall system and each seems to supply a particular territory. Therefore, Contractors have been continually using the option in the Standard Specifications which states "Other types of cribbing not shown on the standard sheets may be furnished and placed, if approved by the D.C.E.S.".

Although this statement allows a Contractor to choose a wall system, other than one of the Department's standards, there is no assurance at the time of bidding that their selection will be approved by the Department for the proposed application. In addition, the time required to review a new or unfamiliar wall system during the construction phase of a project can result in delays getting the product produced and supplied to the project. The creation of an Approved List of Precast Modular Walls will provide Contractors with a selection of wall systems of which the design methodology has already been evaluated by the Department and will also identify approved precast manufacturers who provide the wall systems.

CONTACT: Questions or comments regarding this issuance should be directed to Randall J. Romer, P.E., of the Geotechnical Engineering Bureau at (518) 457-4714, rromer@dot.state.ny.us.

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07030017- BACKFILL FOR PRECAST CONCRETE CRIBBING STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.08010017- METAL BIN-TYPE RETAINING WALL
- ITEM 632.08020017- EXCAVATION FOR METAL BIN-TYPE RETAINING WALL
- ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL

DESCRIPTION

The work consists of furnishing and placing a precast concrete cribbing or metal bin-type retaining wall including all excavation and filling in the manner specified by the contract documents or by the Engineer.

Definitions. The following general definitions shall be used in conjunction with this section:

- A. Unit.** Any single piece used to construct precast concrete cribbing or metal bin-type retaining walls. For precast concrete cribbing the work unit shall include but not be limited to, stretchers, headers (both closed and open face), coping, bearing blocks, full sections, half sections, end sections, and leveling footings. For metal bin-type retaining walls the word unit shall include, but not be limited to, stringers, spacers, columns, column caps, stringer stiffeners and base plates.
- B. Bin.** Any volumetric space which is designated to be filled with backfilling material, as defined in this section, and is enclosed on all four sides by precast concrete cribbing units, or metal bin-type retaining wall units.
- C. Wall.** A series of units to form bins connected in unbroken sequence so that, when filled with backfill material, they will act as a single entity (i.e., a retaining wall).

MATERIALS

A. Unit Materials

Materials shall meet the requirements specified in the following subsections of Section 700:

Precast Modular Walls and Precast Concrete Cribbing	§704-06
Premoulded Resilient Joint Filler	§705-07
Metal Bin-Type Retaining Wall	§715-11

B. Backfill

Backfill Material shall conform to the material requirements for either Stone Filling (Fine), as specified in §620-2.01 and 620-2.02, or Select Granular Fill and Select Structure Fill as specified in §203-2.01 and 203-2.02C.

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
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C. Subsurface Drainage

Material incorporated into the subsurface drainage system, not limited to the following, shall conform to the material requirements for:

Optional Underdrain Pipe	§605-2.01
Underdrain Filter, Type I	§605-2.02
Prefabricated Composite Structural Drain	§737-04

CONSTRUCTION DETAILS

A. Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall

1. Excavation. Excavation shall be conducted in accordance with the applicable requirements of Section 206, Trench, Culvert and Structure Excavation, and the details specified in the contract documents.
2. Foundation. Prior to erection of the wall system, the foundation shall be inspected and approved by the Engineer. Grade the area under the wall level for the width shown in the contract documents. A minimum of 90% of Standard Proctor Maximum Density will be required.
3. Subsurface Drainage System. Install the subsurface drainage system simultaneously with the erection and infill/backfill of the unit/modules to ensure a continuous, uninterrupted system to serve to prevent the accumulation of destabilizing water pressure on the wall. In all cases, the subsurface drainage system will be installed to drain all intercepted water to a point of positive drainage.
4. Erection. All units shall be assembled and handled in accordance with the manufacturer's instructions and the contract documents. During erection, any units damaged beyond repair shall be removed and replaced, by the Contractor, with approved units. The Contractor shall use precast or cast-in-place leveling footings.
5. Backfill. Immediately prior to backfilling, the Engineer shall inspect units for damage. Units, which are damaged beyond repair, will be rejected. Filling the interior of the bins and behind the walls shall progress simultaneously with the erection of the units and the material shall be placed as specified in §203-3.15, Fill and Backfill at Structures, Culverts, Pipes, Conduits and Direct Burial Cables.
6. Contractor Responsibility. Movement of construction equipment and all other vehicles and loads over and adjacent to walls shall be done at the Contractor's risk. Any damage to bins and units from any cause shall be repaired or replaced by the Contractor.

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B. Metal Bin-Type Retaining Wall

The provisions specified in A. Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall shall apply with the following additions and modifications: The ends of all stringers and spacer units shall be bolted to corner columns by means of connecting channels.

In the construction of a wall on a curve, the proper curvature for the face shall be obtained by the use of shorter stringers in the front or rear units of walls as designed in the contract documents.

The wall height and depth may be varied, but not to exceed the maximum dimension shown for the design selected. Two or more wall designs may be incorporated in the same wall by the use of standard split columns to make the connections on the step-back.

METHOD OF MEASUREMENT

A. Precast Concrete Cribbing or Metal Bin-Type Retaining Wall

The quantity of retaining wall shall be measured by the number of square meters of the front wall face computed between the payment lines shown in the contract documents.

B. Excavation and Disposal of Excavated Material for Installation of Cribbing or Retaining Wall

Excavation and disposal of excavated material shall be measured by the number of cubic meters of material measured in its original position between the payment lines shown in the contract documents.

C. Backfill for the Installation of Cribbing or Retaining Wall

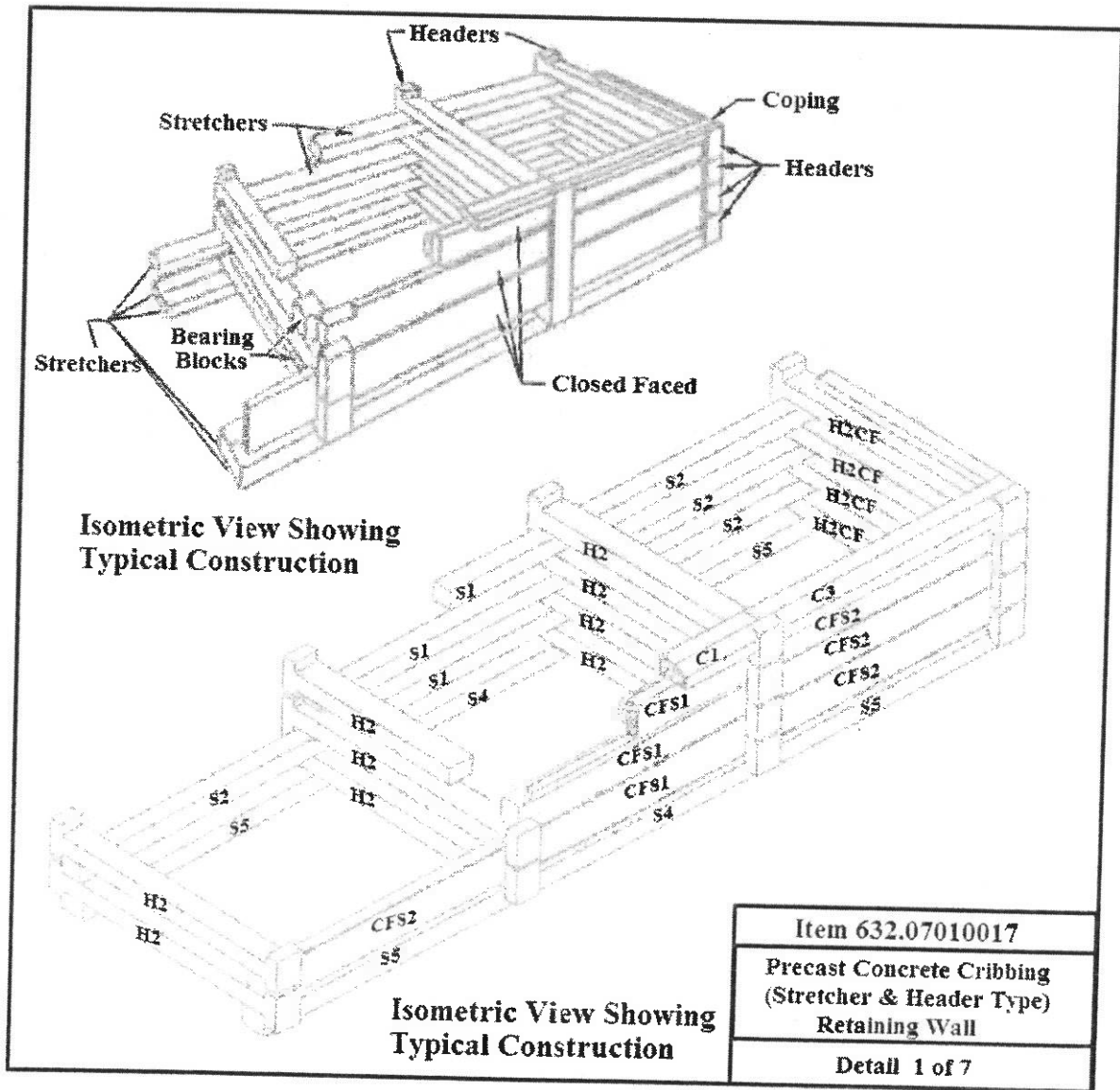
Backfill shall be measured by the number of cubic meters of material, computed between the payment lines shown in the contract documents. Deductions for the volume of units of precast concrete cribbing will be made. No deduction will be made for the volume of a metal-bin unit.

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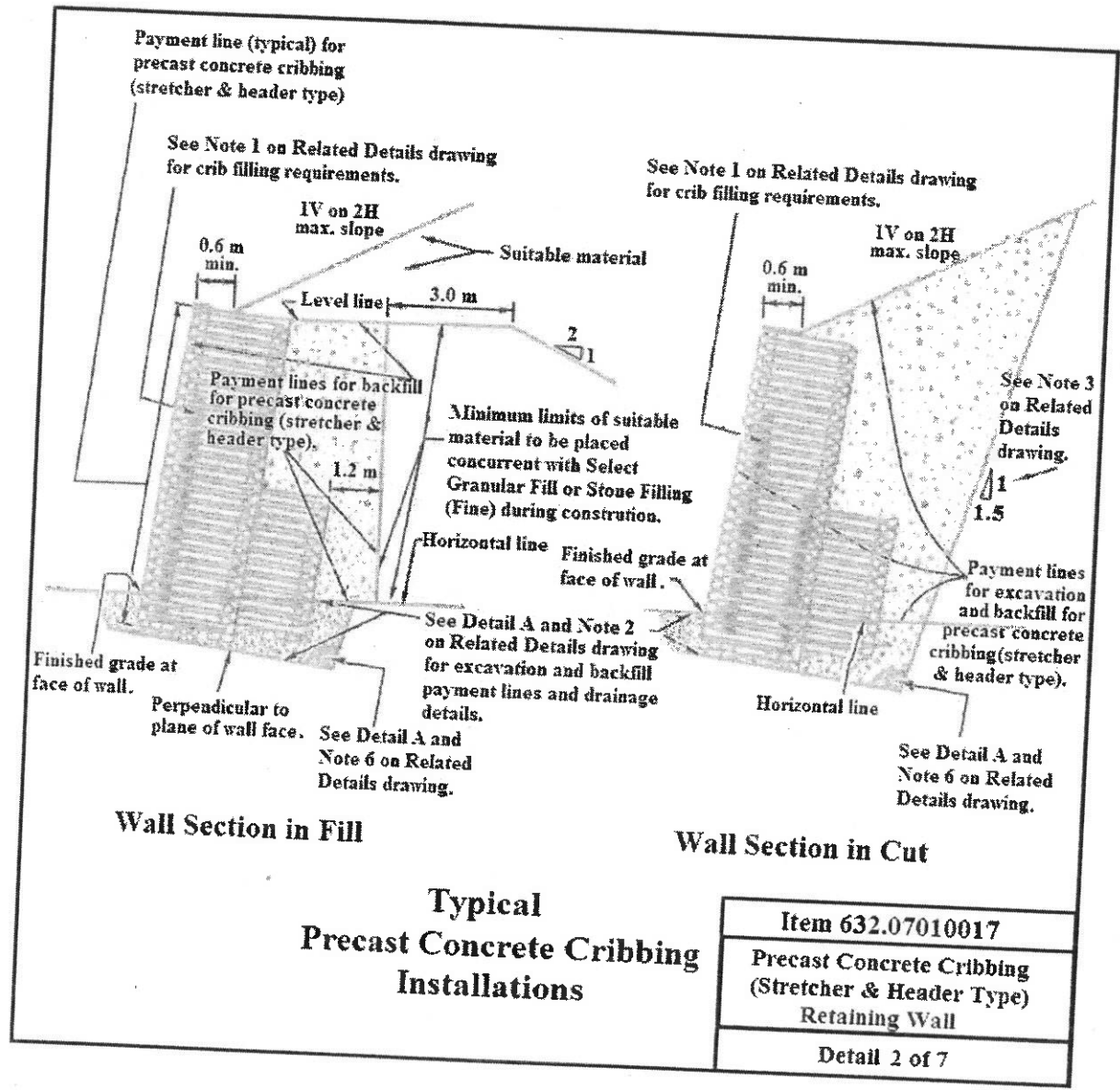
BASIS OF PAYMENT

- A. Precast Concrete Cribbing or Metal Bin-Type Retaining Wall**
The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work including leveling footings required for precast concrete wall units.
- B. Excavation and Disposal of Excavated Material for Installation of Cribbing or Retaining Wall**
The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work.
- C. Backfill for the Installation of Cribbing or Retaining Wall**
The unit price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work. No direct payment will be made for any loss of material which may result from compaction, foundation settlement, erosion, or any other cause. The cost of adding water for compaction of backfill shall be included in the price bid unless the item "Applying Water" is included in the proposal.

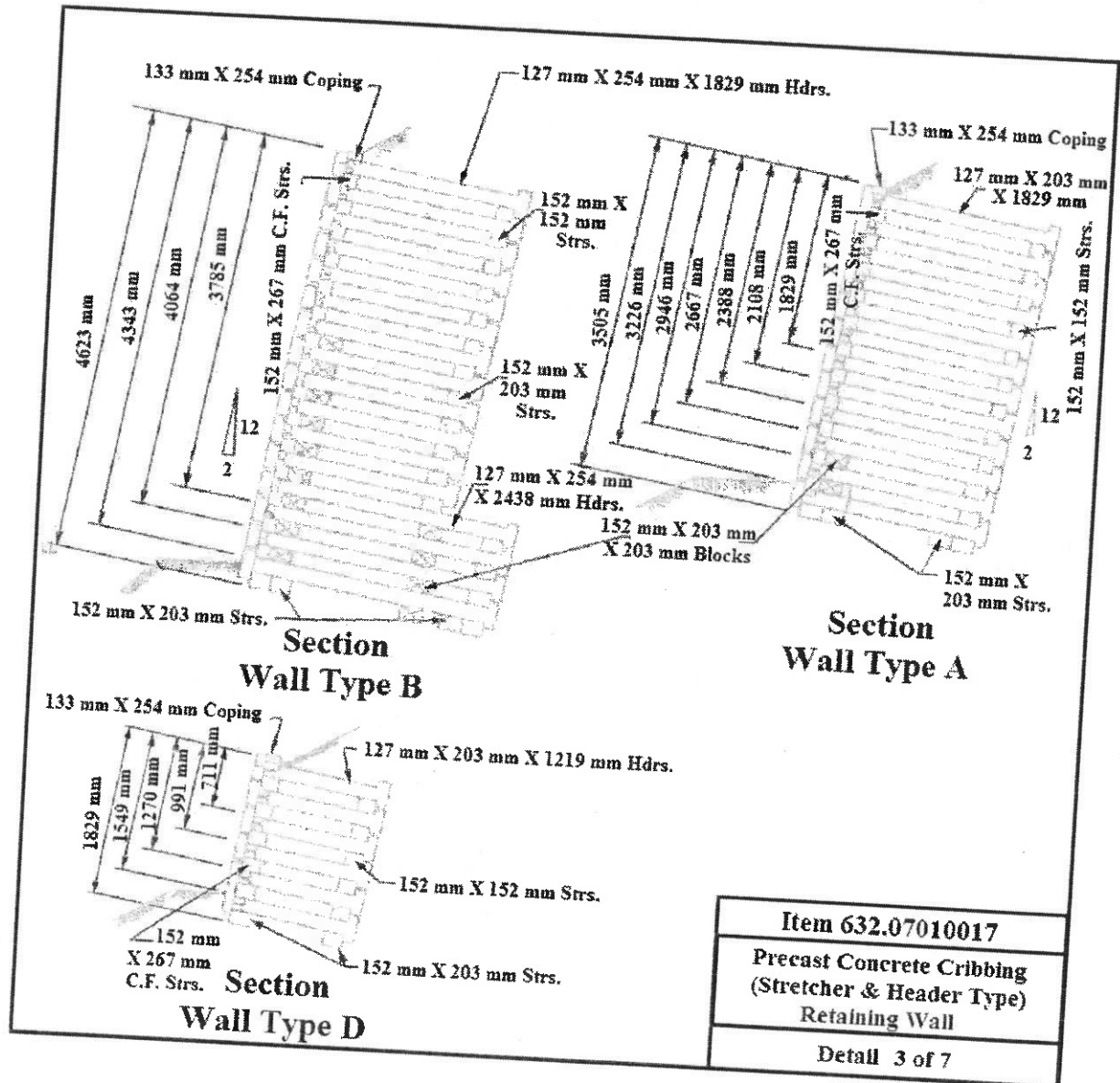
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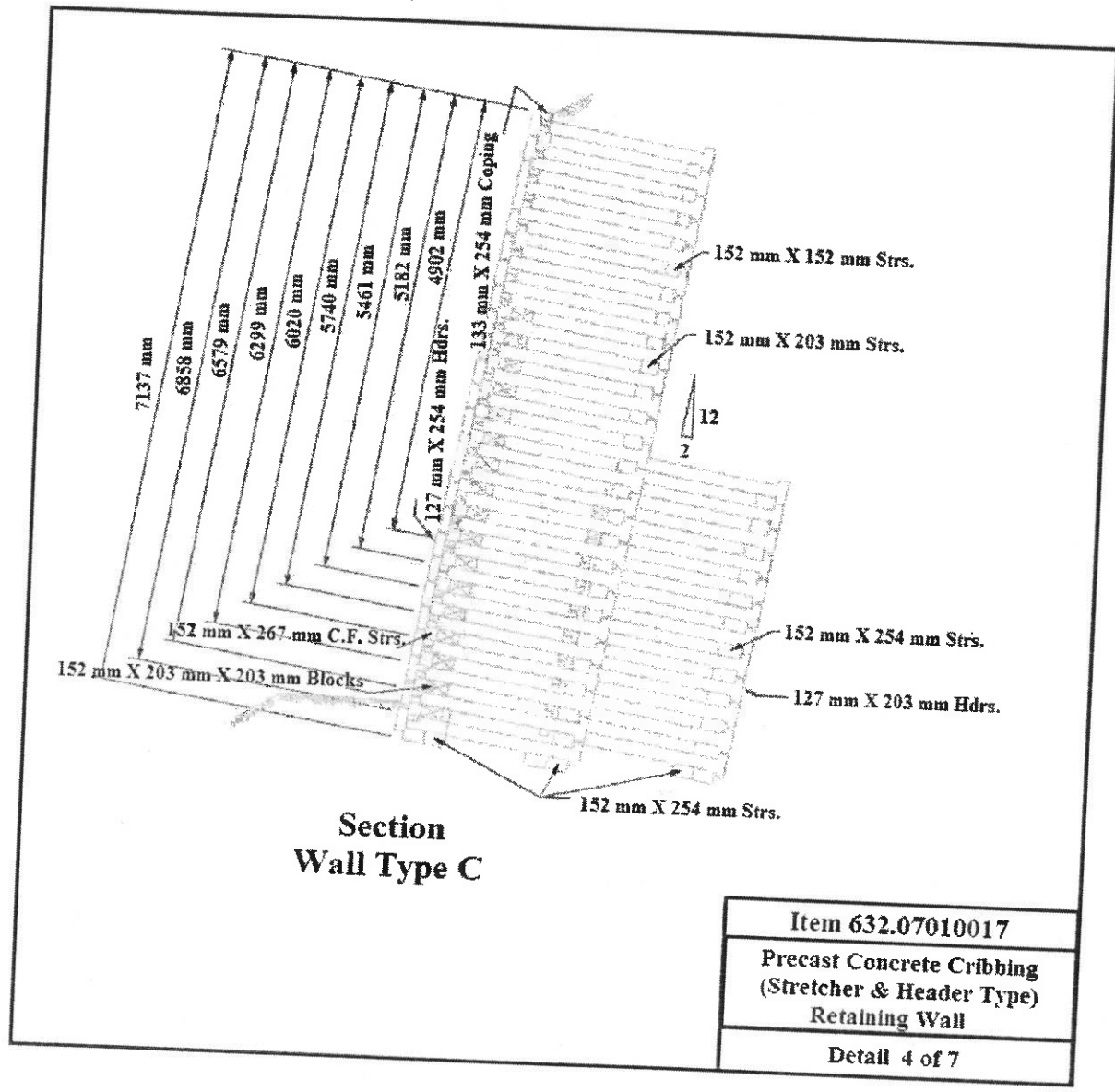
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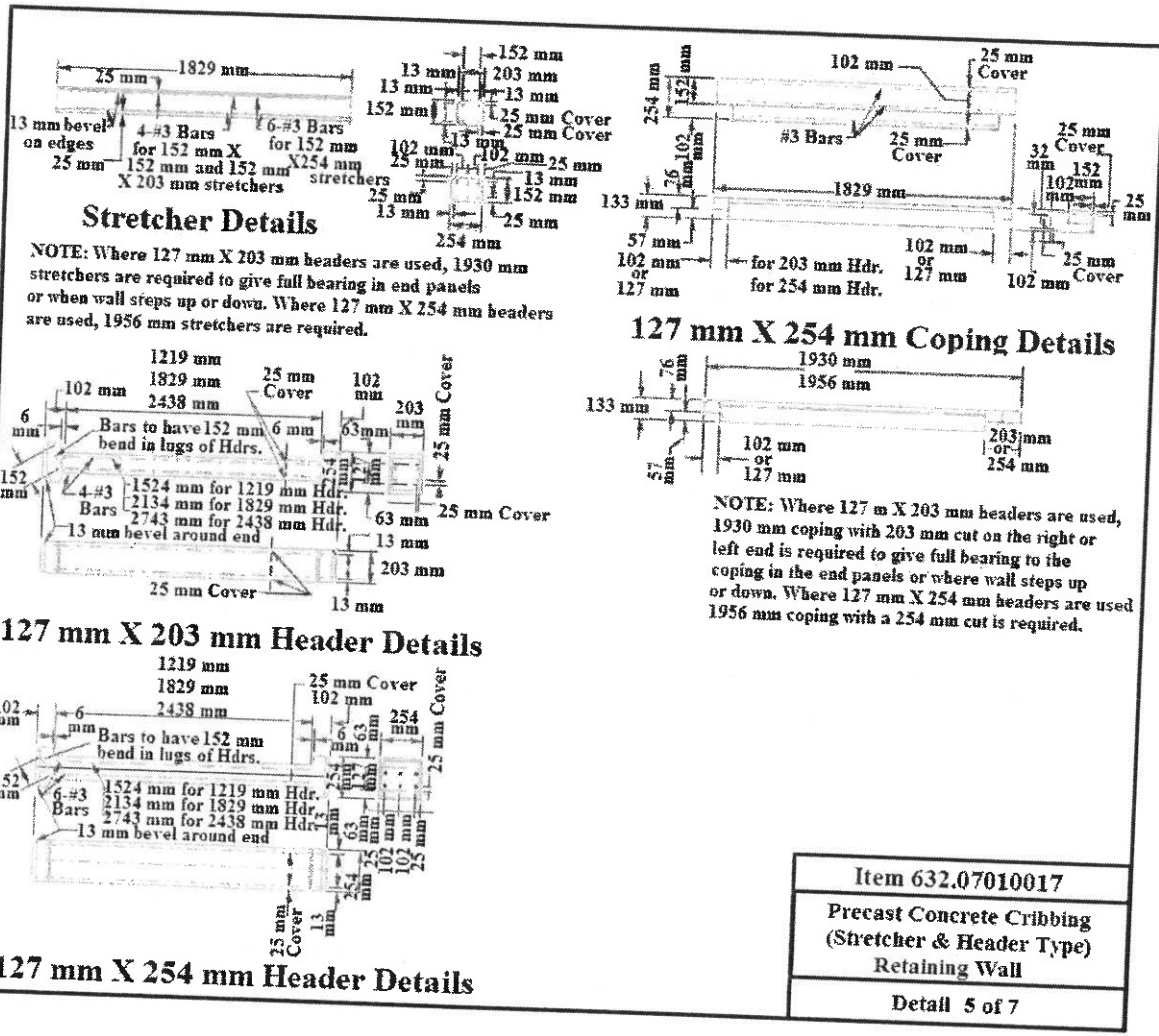
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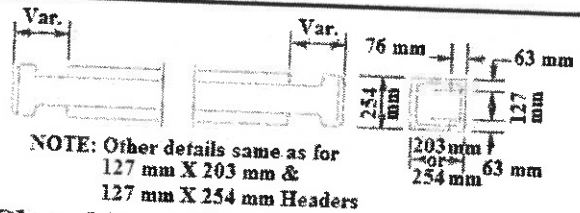


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Item 632.07010017
Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall
Detail 5 of 7

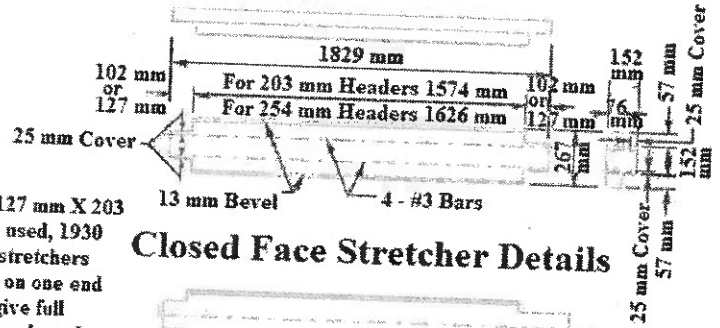
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NOTE: Other details same as for 127 mm X 203 mm & 127 mm X 254 mm Headers

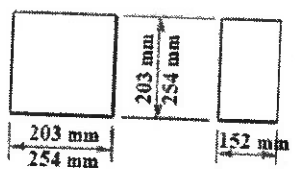
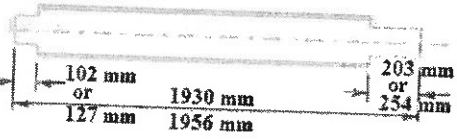
Closed Face Header Details

NOTE: This member used only when end of wall is exposed. Cut made in body of header to fit over stretcher as required.



NOTE: Where 127 mm X 203 mm headers are used, 1930 mm closed face stretchers with 203 mm cut on one end are required to give full bearing in end panels and where wall steps up or down.

Closed Face Stretcher Details



Bearing Block Details

NOTE: If it is desired to mortar blocks in place, blocks of lesser height can be furnished.

Item 632.07010017
Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall
Detail 6 of 7

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
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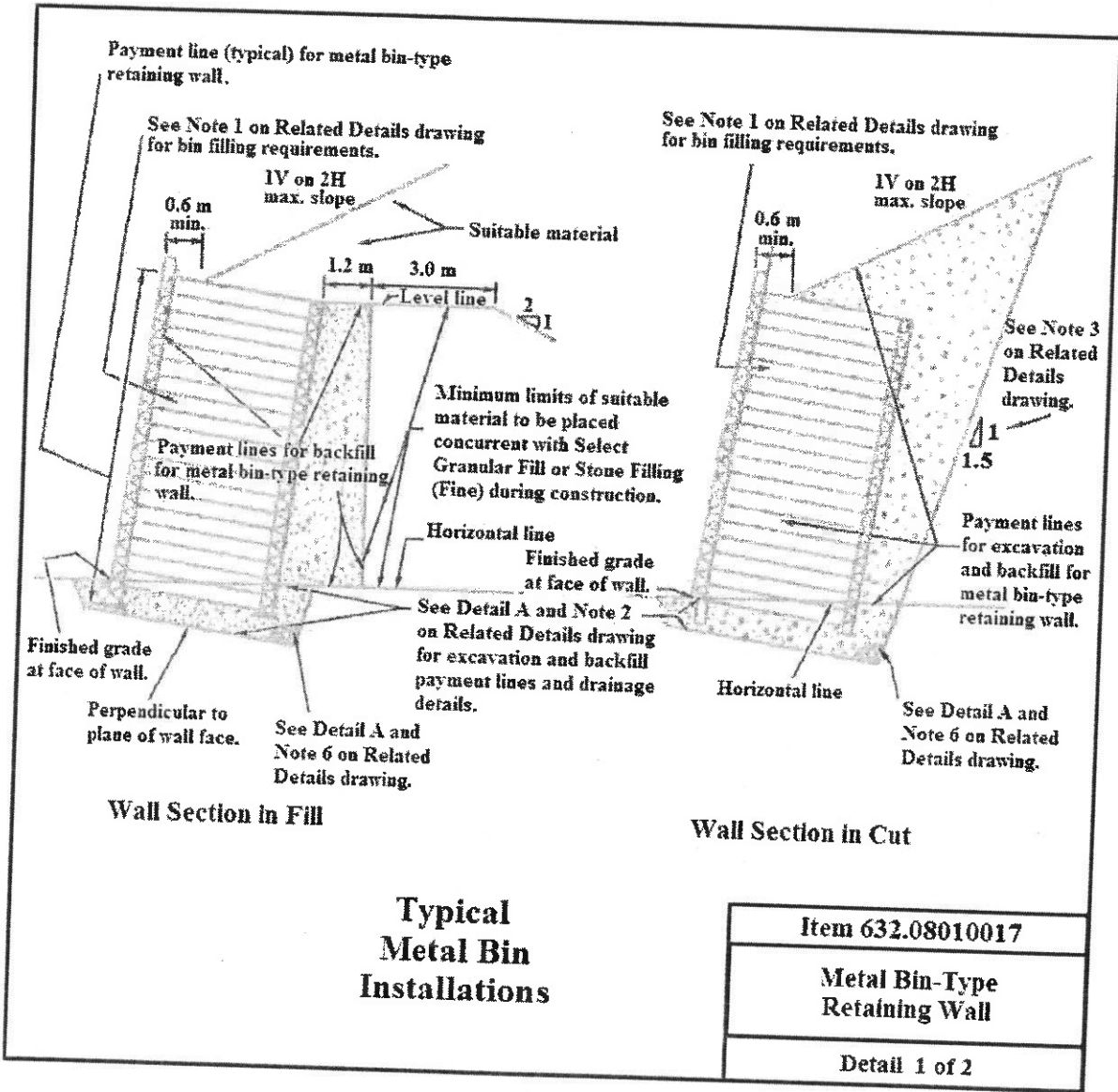
Legend of Members	
Item	Description
152 mm X 152 mm X 1829 mm Stretcher	S1
152 mm X 152 mm X 1930 mm Stretcher	S2
152 mm X 152 mm X 1956 mm Stretcher	S3
152 mm X 203 mm X 1829 mm Stretcher	S4
152 mm X 203 mm X 1930 mm Stretcher	S5
152 mm X 203 mm X 1956 mm Stretcher	S6
152 mm X 254 mm X 1829 mm Stretcher	S7
152 mm X 254 mm X 1930 mm Stretcher	S8
152 mm X 254 mm X 1956 mm Stretcher	S9
133 mm X 254 mm X 1829 mm Coping	C1
133 mm X 254 mm X 1930 mm Coping, 203 mm cut Lt.	C2
133 mm X 254 mm X 1930 mm Coping, 203 mm cut Rt.	C3
133 mm X 254 mm X 1956 mm Coping, 254 mm cut Lt.	C4
133 mm X 254 mm X 1956 mm Coping, 254 mm cut Rt.	C5
152 mm X 267 mm X 1829 mm Closed Face Stretcher	CFS1
152 mm X 267 mm X 1930 mm Closed Face Stretcher	CFS2
152 mm X 267 mm X 1956 mm Closed Face Stretcher	CFS3
127 mm X 203 mm X 1219 mm Header	H1
127 mm X 203 mm X 1829 mm Header	H2
127 mm X 203 mm X 2438 mm Header	H3
127 mm X 254 mm X 1219 mm Header	H4
127 mm X 254 mm X 1829 mm Header	H5
127 mm X 254 mm X 2438 mm Header	H6
127 mm X 203 mm X 1219 mm Closed Face Header	H1CF
127 mm X 203 mm X 1829 mm Closed Face Header	H2CF
127 mm X 203 mm X 2438 mm Closed Face Header	H3CF
127 mm X 254 mm X 1219 mm Closed Face Header	H4CF
127 mm X 254 mm X 1829 mm Closed Face Header	H5CF
127 mm X 254 mm X 2438 mm Closed Face Header	H6CF
152 mm X 203 mm X 203 mm Block	B1
152 mm X 203 mm X 254 mm Block	B2
152 mm X 254 mm X 254 mm Block	B3

NOTES:

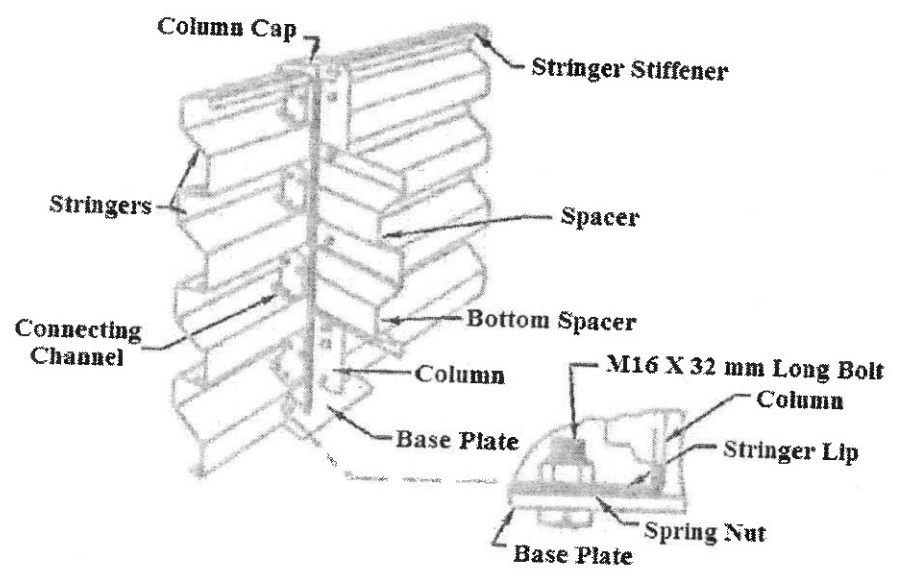
1. Walls up to 1829 mm high may be erected plumb. Walls greater than 1829 mm in height shall be battered back at least 167 mm per meter of height.
2. Stretchers should be laid back 6 mm from projecting lugs on headers to relieve lugs of unnecessary strain if fill material settles within wall.
3. Pads of 6 mm expansion joint material should be used between headers and stretchers to insure perfect bearing and flexibility of the wall. This practice is recommended for walls set on a batter only. Single pads of roofing paper may be used on plumb walls.
4. Placement of material within Crib or Bin walls shall be in accordance with the following:
 - A. Where concrete crib is specified to be filled with Select Granular Fill, the material shall be placed and compacted in accordance with section 203-3.15.
 - B. Where concrete crib walls are to be filled with Stone Filling (Fine) (Section 620-2), the material shall be placed in a manner approved by the Engineer to achieve maximum crib stability. Dumping of stone filling with a free fall greater than 0.6 m will not be permitted.

Item 632.07010017
Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall
Detail 7 of 7

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
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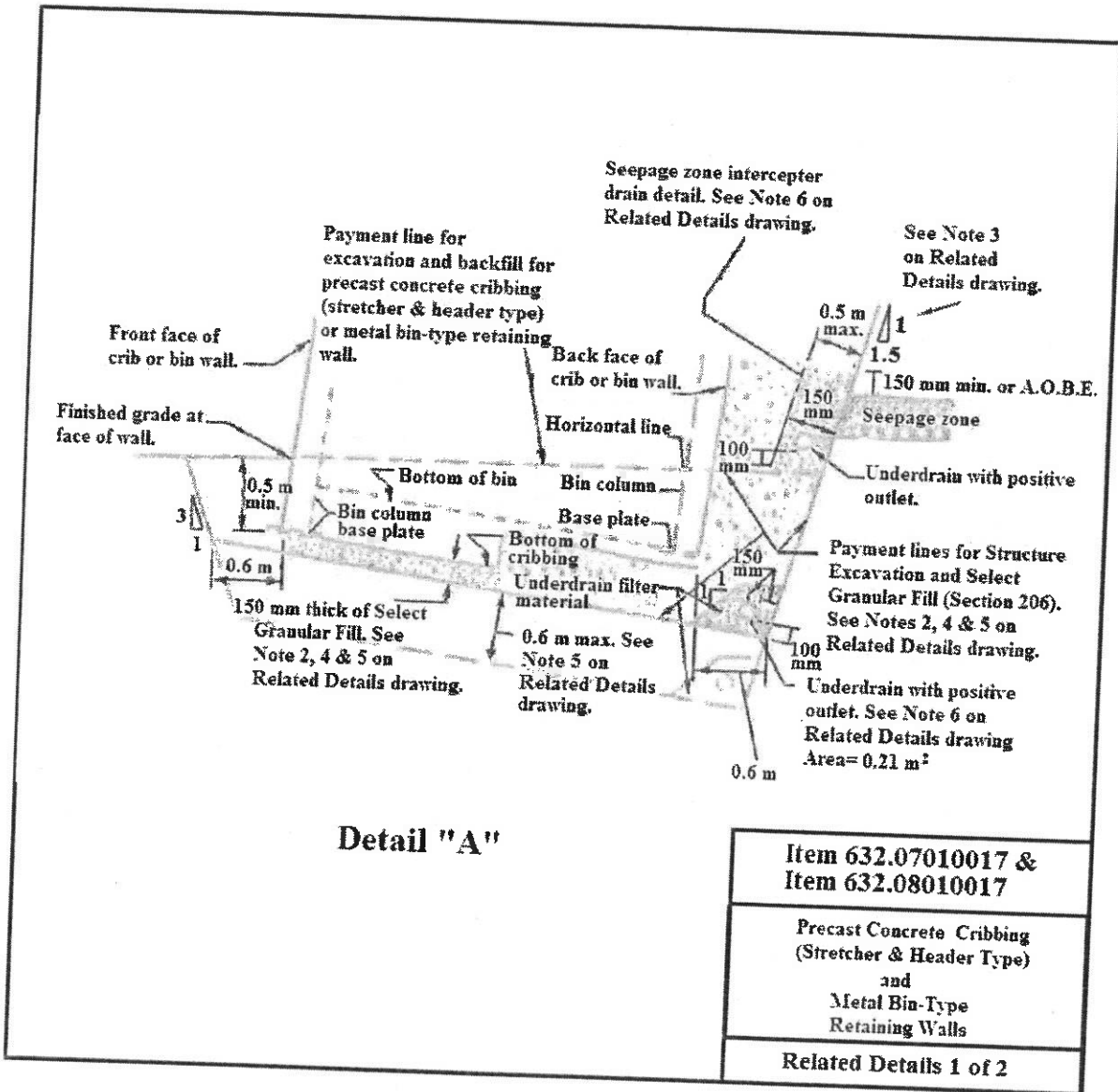
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Bin Assembly at Front Column

Item 632.08010017
Metal Bin-Type Retaining Wall
Detail 2 of 2

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
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Installation Notes

1. Placement of the fill material within the crib or bin walls shall be in accordance with the following:
 - A. Where the precast concrete crib or metal bins are to be filled with Stone Filling (Fine), the material shall be placed and compacted in a manner acceptable to the Engineer. Dumping of stone fill with a free fall greater than 0.6 m will not be permitted.
 - B. Where the precast concrete crib or metal bins are required to be filled with Select Granular Fill, the material shall be placed and compacted in accordance with Subsection 203-3.15 entitled "Fill and Backfill at Structures, Culverts, Pipes, Conduits, and Direct Burial Cables".
 - C. At no time shall the difference in backfill elevation between the interior and exterior of the wall exceed 1.2 m.
 - D. The elevation of the backfill behind the wall shall not exceed the elevation of the fill material placed in the bins or cribs.
 - E. Placement of fill in the cribs or bins and backfill behind the wall shall closely follow erection of successive courses of units.
 - F. In computing the volume of precast concrete cribbing backfill, a deduction shall be made for the volume of concrete cribbing units. No deduction shall be made for the volume of the metal bin members.
2. Compaction requirements for Select Granular Fill behind and beneath walls shall be in accordance with Subsection 203-3.15 entitled "Fill and Backfill at Structures, Culverts, Pipes, Conduits, and Direct Burial Conduits". Stone Filling (Fine) shall be compacted in a manner acceptable to the Engineer.
3. If the Contractor elects not to lay the slope back as detailed, any excavation support system used must be designed in accordance with the geotechnical design procedures for flexible wall systems.
4. The Select Granular Fill shall be placed to provide uniform and adequate support of the base plates and/or bottom crib members at proper line, grade and batter. Shims or drift pins shall not be used to correct improper or inaccurate bedding.
5.
 - A. Undercutting to the maximum limits shown may be ordered by the Engineer where necessary to provide stable bedding conditions. Undercutting shall be paid for under Section 206.
 - B. If undercutting is ordered, the lift thickness and compaction requirements for the Select Granular Fill shall be as ordered by the Engineer.
 - C. The Regional Geotechnical Engineer shall be consulted if it appears that the undercutting beyond the 0.6 m max. depth may be needed. Special construction procedures and details will be shown on the plans when walls are to be located in areas where unsuitable material exists.
6. Seepage zones intercepting the excavation slope or the wall foundation area shall be positively drained by providing additional underdrain or underdrain filter material at the seepage zone. For marine installations or other special situations where the water level will be permanently above the finished grade at the wall face, the normal underdrain section shall be raised to a point 0.6 m above mean high water.
7. Wherever practical, construction shall be started at the lowest elevation on the profile and progressed up grade.
8. All bin or crib walls shall at all stages of their construction be true to line and grade. Any deviation from line and grade which in the judgement of the Engineer is either dangerous to the stability or detracts from the appearance of the wall shall be corrected by the Contractor at his/her own expense. All damaged portions of crib or bin walls from any cause whatsoever shall be replaced at the Contractors expense.

Item 632.07010017 &
Item 632.08010017

Precast Concrete Cribbing
(Stretcher & Header Type)
and
Metal Bin-Type
Retaining Walls

Related Details 2 of 2

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07030017- BACKFILL FOR PRECAST CONCRETE CRIBBING STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.08010017- METAL BIN-TYPE RETAINING WALL
- ITEM 632.08020017- EXCAVATION FOR METAL BIN-TYPE RETAINING WALL
- ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL

DESCRIPTION

The work consists of furnishing and placing a precast concrete cribbing or metal bin-type retaining wall including all excavation and filling in the manner specified by the contract documents or by the Engineer.

Definitions. The following general definitions shall be used in conjunction with this section:

- A. Unit.** Any single piece used to construct precast concrete cribbing or metal bin-type retaining walls. For precast concrete cribbing the work unit shall include but not be limited to, stretchers, headers (both closed and open face), coping, bearing blocks, full sections, half sections, end sections, and leveling footings. For metal bin-type retaining walls the word unit shall include, but not be limited to, stringers, spacers, columns, column caps, stringer stiffeners and base plates.
- B. Bin.** Any volumetric space which is designated to be filled with backfilling material, as defined in this section, and is enclosed on all four sides by precast concrete cribbing units, or metal bin-type retaining wall units.
- C. Wall.** A series of units to form bins connected in unbroken sequence so that, when filled with backfill material, they will act as a single entity (i.e., a retaining wall).

MATERIALS

A. Unit Materials

Materials shall meet the requirements specified in the following subsections of Section 700:

Precast Modular Walls and Precast Concrete Cribbing	§704-06
Premoulded Resilient Joint Filler	§705-07
Metal Bin-Type Retaining Wall	§715-11

B. Backfill

Backfill Material shall conform to the material requirements for either Stone Filling (Fine), as specified in §620-2.01 and 620-2.02, or Select Granular Fill and Select Structure Fill as specified in §203-2.01 and 203-2.02C.

C. Subsurface Drainage

Material incorporated into the subsurface drainage system, not limited to the following, shall conform to the material requirements for:

Optional Underdrain Pipe	§605-2.01
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- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING STRETCHER & HEADER TYPE) RETAINING WALL
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- ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL

Underdrain Filter, Type I	§605-2.02
Prefabricated Composite Structural Drain	§737-04

CONSTRUCTION DETAILS

A. Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall

1. Excavation. Excavation shall be conducted in accordance with the applicable requirements of Section 206, Trench, Culvert and Structure Excavation, and the details specified in the contract documents.
2. Foundation. Prior to erection of the wall system, the foundation shall be inspected and approved by the Engineer. Grade the area under the wall level for the width shown in the contract documents. A minimum of 90% of Standard Proctor Maximum Density will be required.
3. Subsurface Drainage System. Install the subsurface drainage system simultaneously with the erection and infill/backfill of the unit/modules to ensure a continuous, uninterrupted system to serve to prevent the accumulation of destabilizing water pressure on the wall. In all cases, the subsurface drainage system will be installed to drain all intercepted water to a point of positive drainage.
4. Erection. All units shall be assembled and handled in accordance with the manufacturer's instructions and the contract documents. During erection, any units damaged beyond repair shall be removed and replaced, by the Contractor, with approved units. The Contractor shall use precast or cast-in-place leveling footings.
5. Backfill. Immediately prior to backfilling, the Engineer shall inspect units for damage. Units, which are damaged beyond repair, will be rejected. Filling the interior of the bins and behind the walls shall progress simultaneously with the erection of the units and the material shall be placed as specified in §203-3.15, Fill and Backfill at Structures, Culverts, Pipes, Conduits and Direct Burial Cables.
6. Contractor Responsibility. Movement of construction equipment and all other vehicles and loads over and adjacent to walls shall be done at the Contractor's risk. Any damage to bins and units from any cause shall be repaired or replaced by the Contractor.

B. Metal Bin-Type Retaining Wall

The provisions specified in A. Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall shall apply with the following additions and modifications:

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07030017- BACKFILL FOR PRECAST CONCRETE CRIBBING STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.08010017- METAL BIN-TYPE RETAINING WALL
- ITEM 632.08020017- EXCAVATION FOR METAL BIN-TYPE RETAINING WALL
- ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL

The ends of all stringers and spacer units shall be bolted to corner columns by means of connecting channels.

In the construction of a wall on a curve, the proper curvature for the face shall be obtained by the use of shorter stringers in the front or rear units of walls as designed in the contract documents.

The wall height and depth may be varied, but not to exceed the maximum dimension shown for the design selected. Two or more wall designs may be incorporated in the same wall by the use of standard split columns to make the connections on the step-back.

METHOD OF MEASUREMENT

A. Precast Concrete Cribbing or Metal Bin-Type Retaining Wall

The quantity of retaining wall shall be measured by the number of square feet of the front wall face computed between the payment lines shown in the contract documents.

B. Excavation and Disposal of Excavated Material for Installation of Cribbing or Retaining Wall

Excavation and disposal of excavated material shall be measured by the number of cubic yards of material measured in its original position between the payment lines shown in the contract documents.

C. Backfill for the Installation of Cribbing or Retaining Wall

Backfill shall be measured by the number of cubic yards of material, computed between the payment lines shown in the contract documents. Deductions for the volume of units of precast concrete cribbing will be made. No deduction will be made for the volume of a metal-bin unit.

BASIS OF PAYMENT

A. Precast Concrete Cribbing or Metal Bin-Type Retaining Wall

The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work including leveling footings required for precast concrete wall units.

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
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- ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL

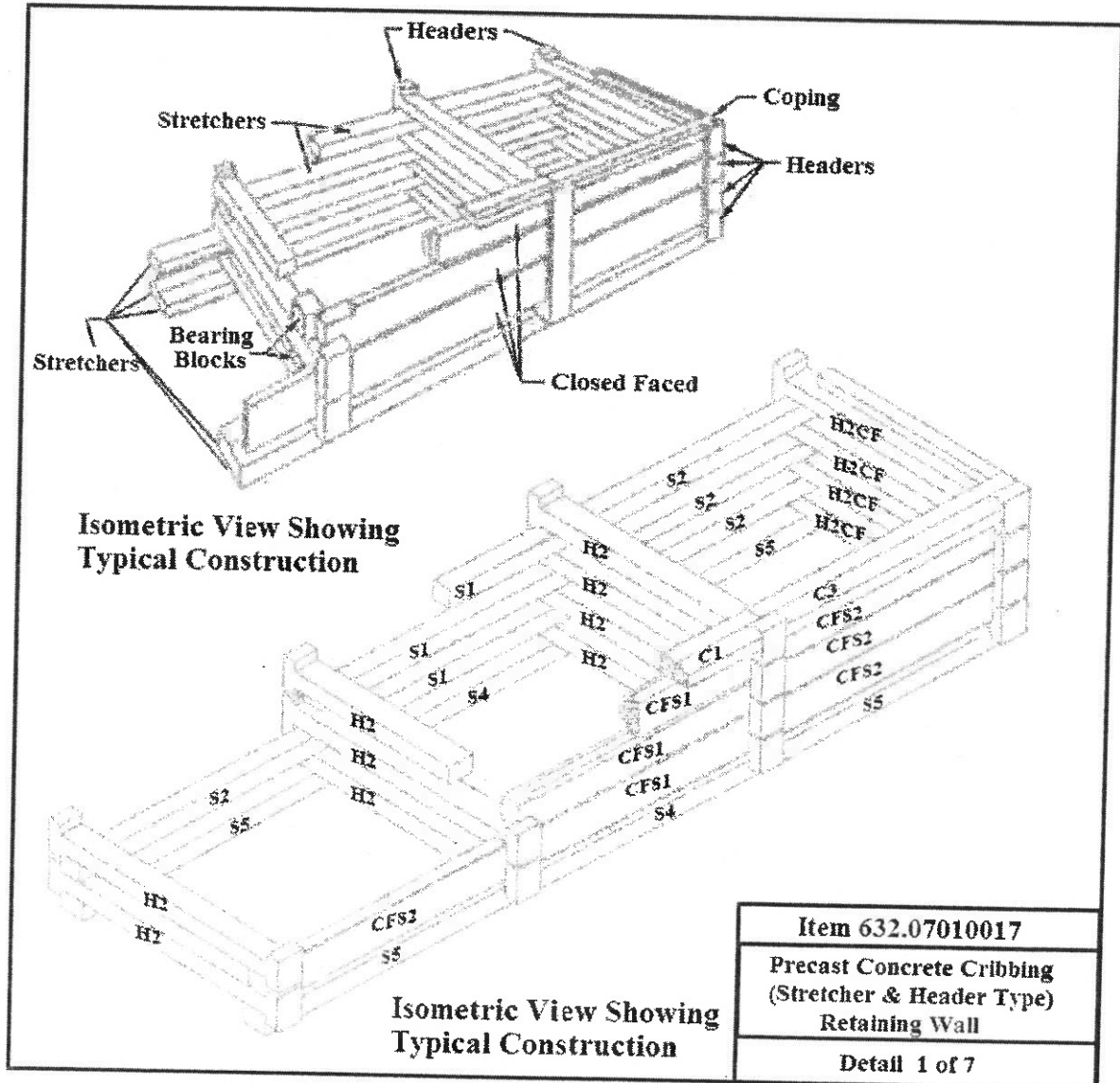
B. Excavation and Disposal of Excavated Material for Installation of Cribbing or Retaining Wall

The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work.

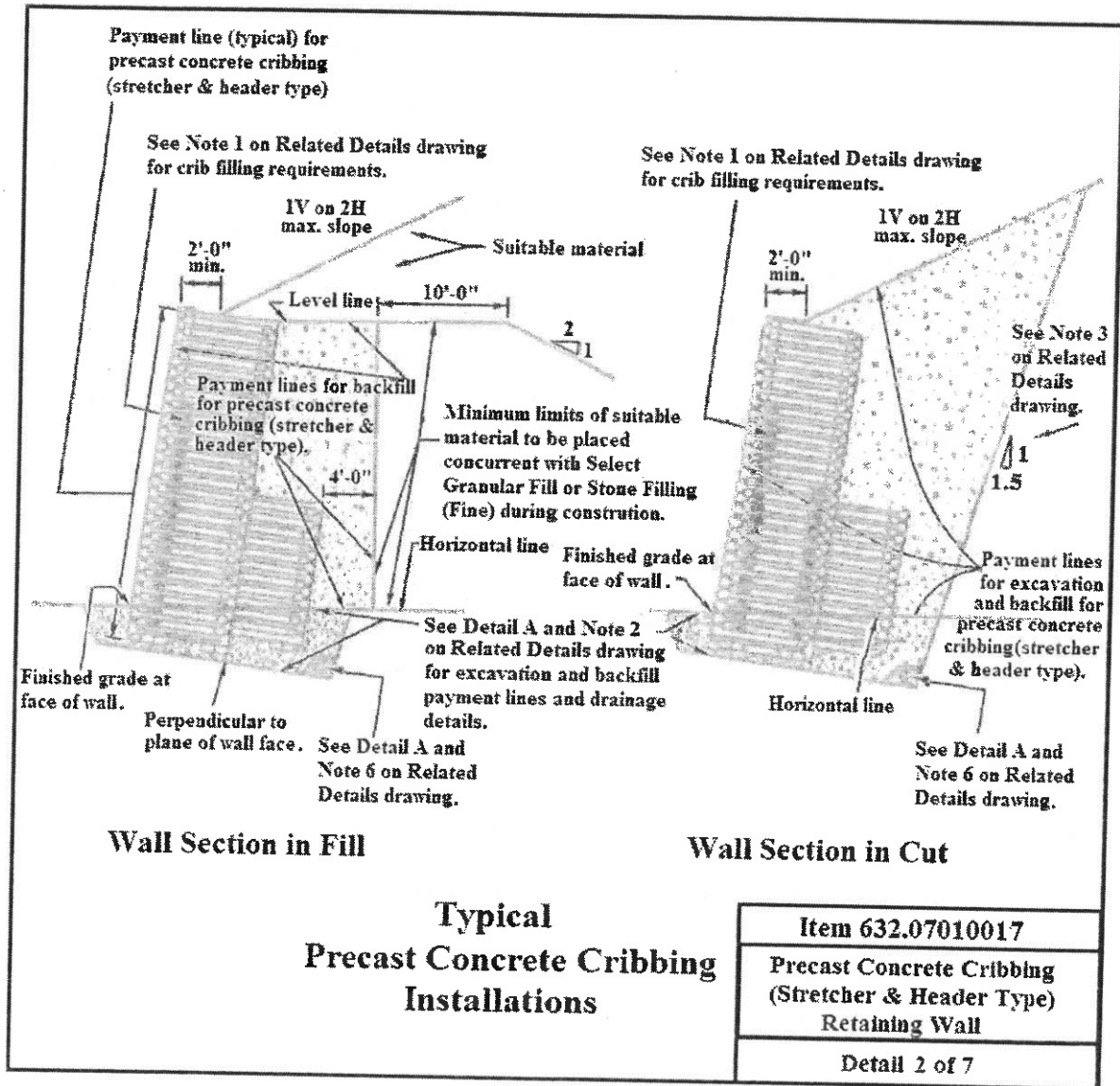
C. Backfill for the Installation of Cribbing or Retaining Wall

The unit price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work. No direct payment will be made for any loss of material which may result from compaction, foundation settlement, erosion, or any other cause. The cost of adding water for compaction of backfill shall be included in the price bid unless the item "Applying Water" is included in the proposal.

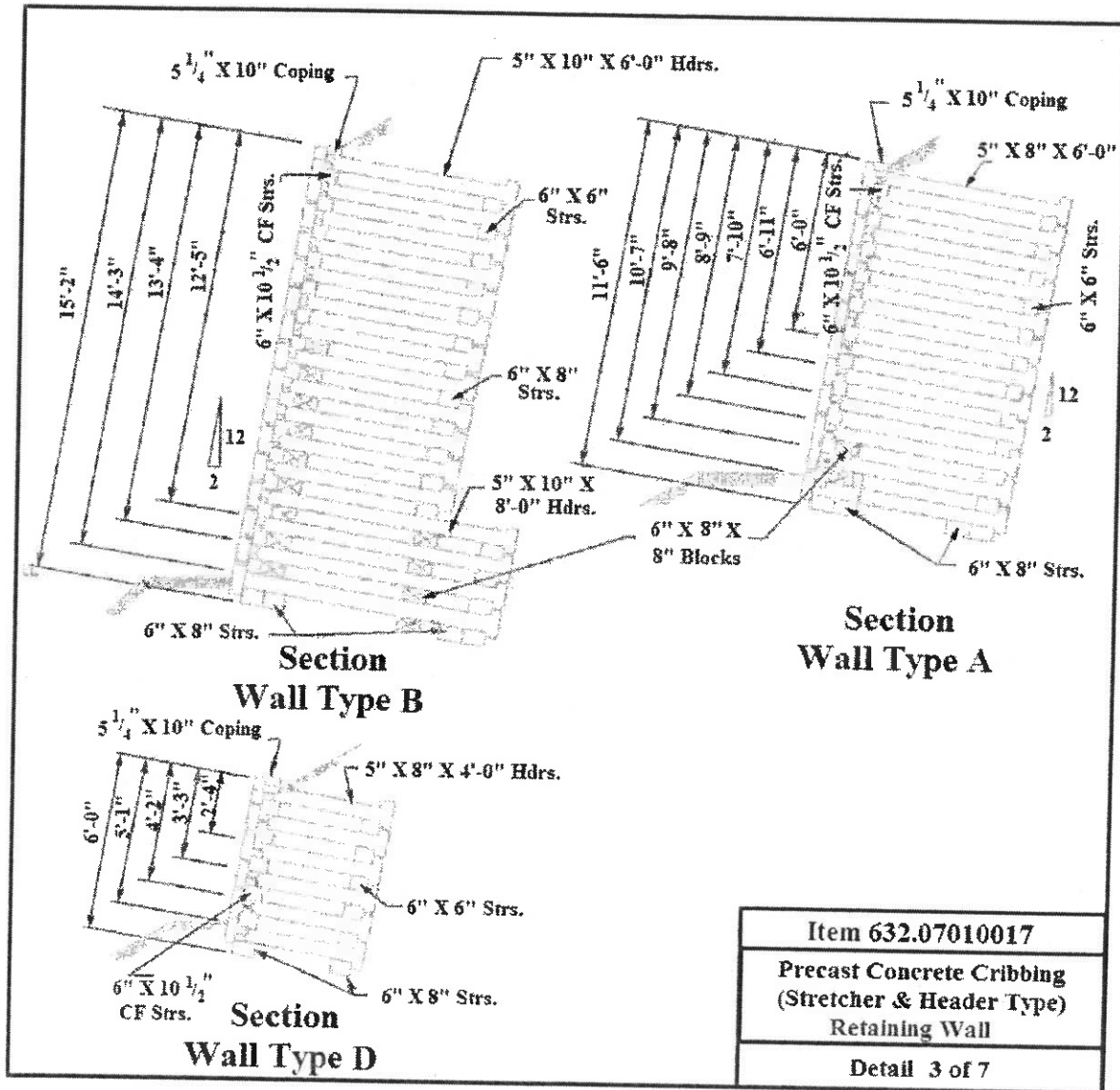
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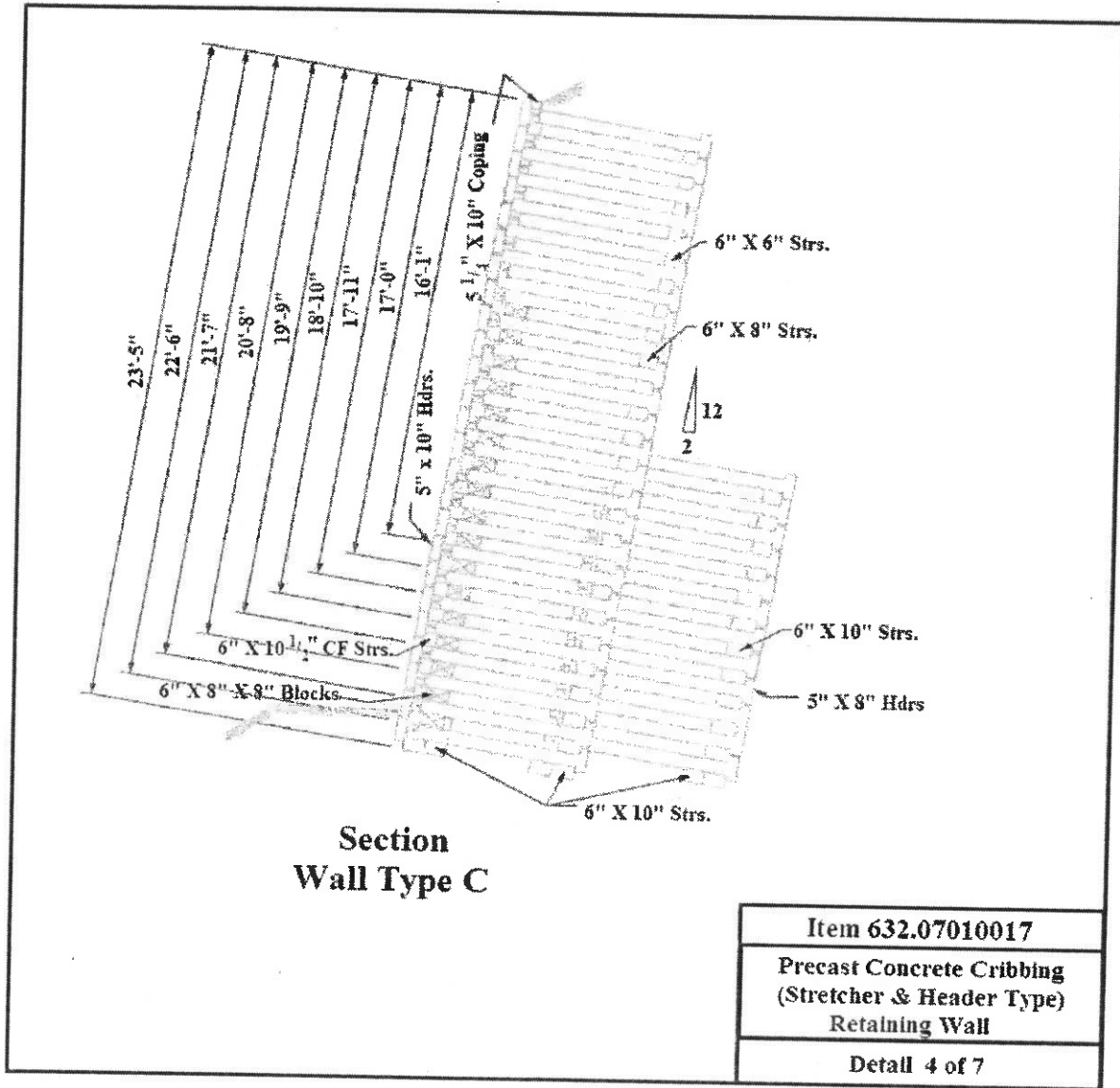
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ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL

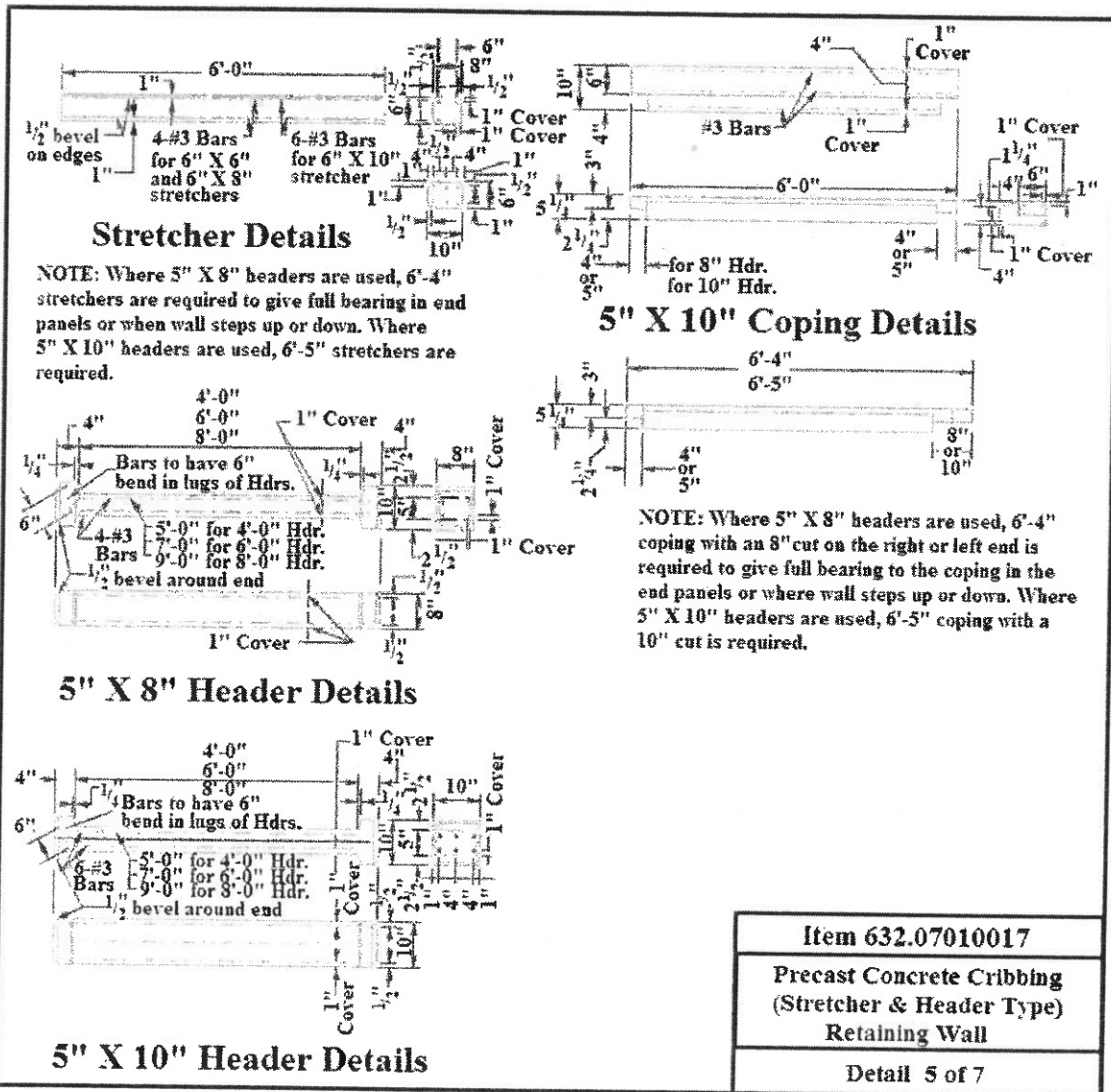
ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL

ITEM 632.07030017- BACKFILL FOR PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL

ITEM 632.08010017- METAL BIN-TYPE RETAINING WALL

ITEM 632.08020017- EXCAVATION FOR METAL BIN-TYPE RETAINING WALL

ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL



ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL

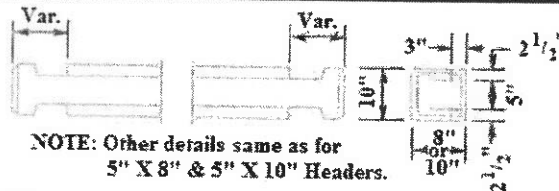
ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL

ITEM 632.07030017- BACKFILL FOR PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL

ITEM 632.08010017- METAL BIN-TYPE RETAINING WALL

ITEM 632.08020017- EXCAVATION FOR METAL BIN-TYPE RETAINING WALL

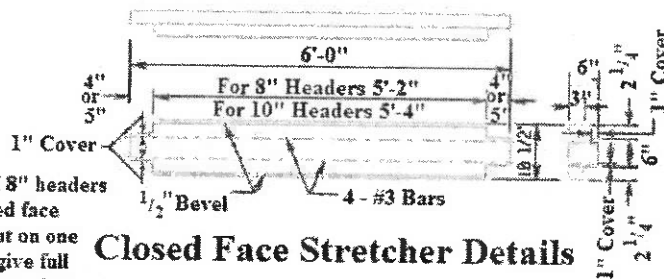
ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL



NOTE: Other details same as for 5" X 8" & 5" X 10" Headers.

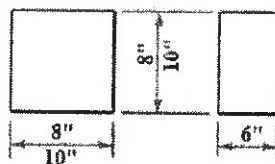
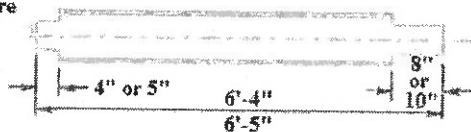
Closed Face Header Details

NOTE: This member used only when end of wall is exposed. Cut made in body of header to fit over stretcher as required.



NOTE: Where 5" X 8" headers are used, 6'-4" closed face stretchers with 8" cut on one end are required to give full bearing in end panels and where wall steps up or down.

Closed Face Stretcher Details



Bearing Block Details

NOTE: If it is desired to mortar blocks in place, blocks of lesser height can be furnished.

Item 632.07010017
Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall
Detail 6 of 7

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
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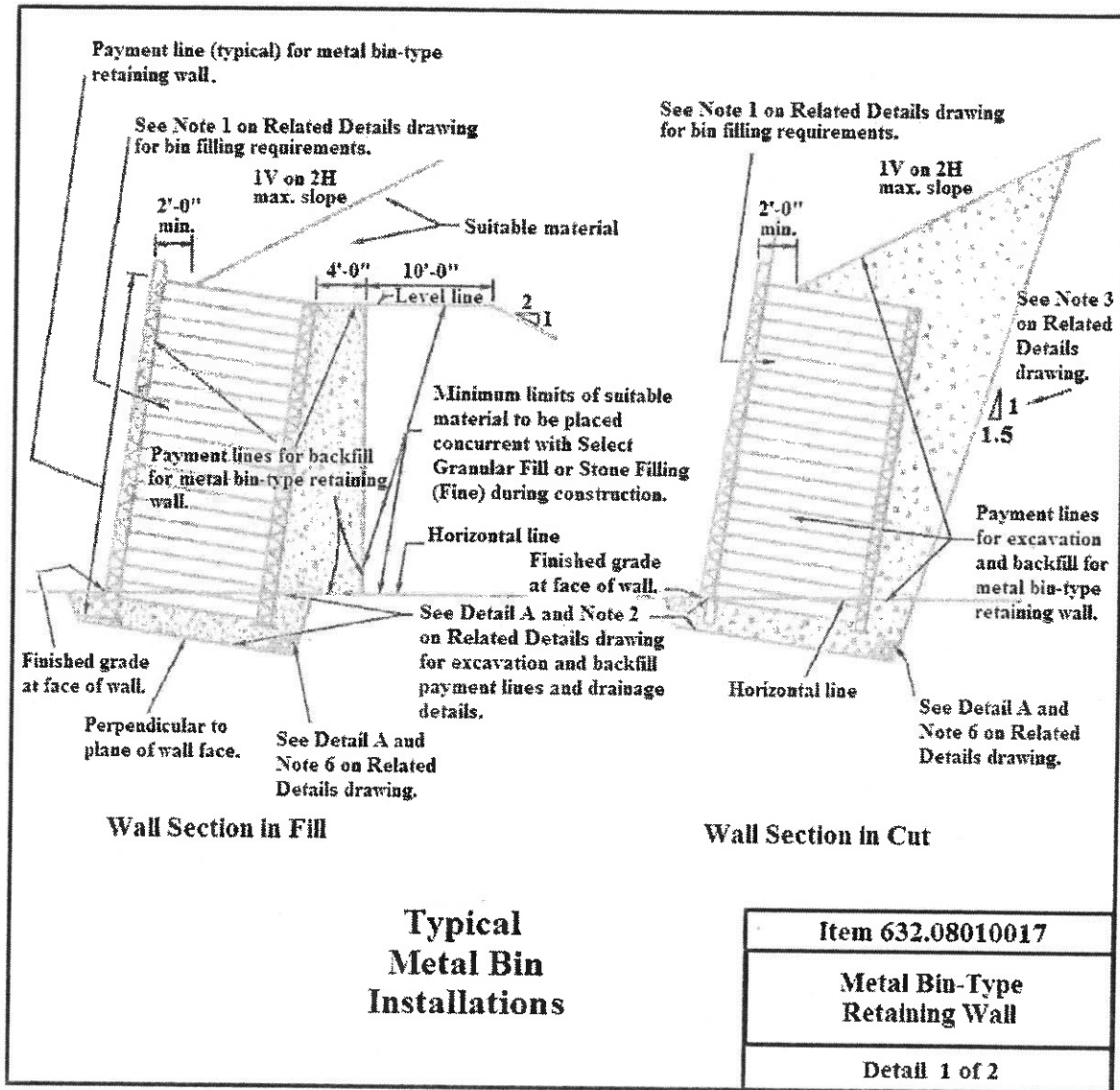
Legend of Members	
Item	Description
6" X 6" X 6'-0" Stretcher	S1
6" X 6" X 6'-4" Stretcher	S2
6" X 6" X 6'-5" Stretcher	S3
6" X 8" X 6'-0" Stretcher	S4
6" X 8" X 6'-4" Stretcher	S5
6" X 8" X 6'-5" Stretcher	S6
6" X 10" X 6'-0" Stretcher	S7
6" X 10" X 6'-4" Stretcher	S8
6" X 10" X 6'-5" Stretcher	S9
5 1/4" X 10" X 6'-0" Coping	C1
5 1/4" X 10" X 6'-4" Coping, 8" Cut Lt.	C2
5 1/4" X 10" X 6'-4" Coping, 8" Cut Rt.	C3
5 1/4" X 10" X 6'-5" Coping, 10" Cut Lt.	C4
5 1/4" X 10" X 6'-5" Coping, 10" Cut Rt.	C5
6" X 10 1/2" X 6'-0" Closed Face Stretcher	CFS1
6" X 10 1/2" X 6'-4" Closed Face Stretcher	CFS2
6" X 10 1/2" X 6'-5" Closed Face Stretcher	CFS3
5" X 8" X 4'-0" Header	H1
5" X 8" X 6'-0" Header	H2
5" X 8" X 8'-0" Header	H3
5" X 10" X 4'-0" Header	H4
5" X 10" X 6'-0" Header	H5
5" X 10" X 8'-0" Header	H6
5" X 8" X 4'-0" Closed Face Header	H1CF
5" X 8" X 6'-0" Closed Face Header	H2CF
5" X 8" X 8'-0" Closed Face Header	H3CF
5" X 10" X 4'-0" Closed Face Header	H4CF
5" X 10" X 6'-0" Closed Face Header	H5CF
5" X 10" X 8'-0" Closed Face Header	H6CF
6" X 8" X 8" Block	B1
6" X 8" X 10" Block	B2
6" X 10" X 10" Block	B3

NOTES:

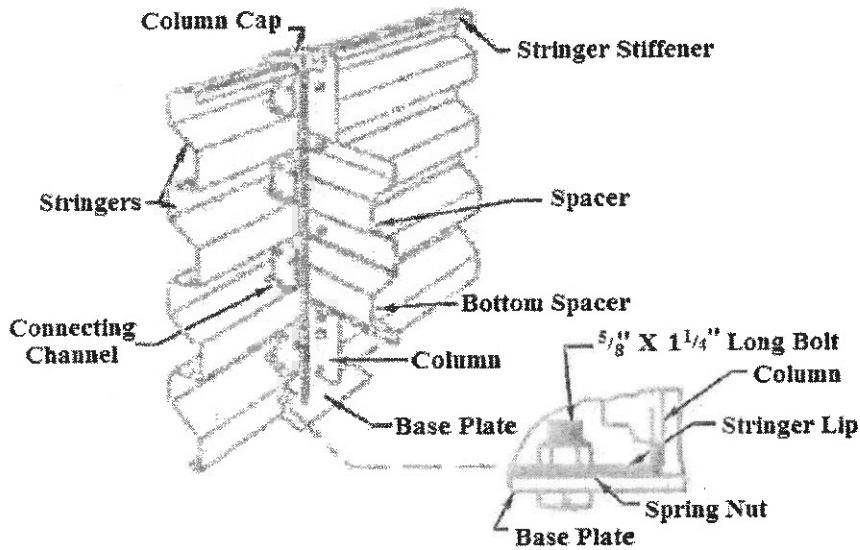
1. Walls up to 6'-0" high may be erected plumb. Walls greater than 6'-0" in height shall be battered back at least 2 inches per foot of height.
2. Stretchers should be laid back 1/4" from projecting lugs on headers to relieve lugs of unnecessary strain if fill material settles within wall.
3. Pads of 1/4" expansion joint material should be used between headers and stretchers to insure perfect bearing and flexibility of the wall. This practice is recommended for walls set on a batter only. Single pads of roofing paper may be used on plumb walls.
4. Placement of material within Crib or Bin walls shall be in accordance with the following:
 - A. Where concrete crib is specified to be filled with Select Granular Fill, the material shall be placed and compacted in accordance with section 203-3.15.
 - B. Where concrete crib walls are to be filled with Stone Filling (Fine) (Section 620-2), the material shall be placed in a manner approved by the Engineer to achieve maximum crib stability. Dumping of stone filling with a free fall greater than 2'-0" will not be permitted.

Item 632.07010017
Precast Concrete Cribbing (Stretcher & Header Type) Retaining Wall
Detail 7 of 7

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07030017- BACKFILL FOR PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.08010017- METAL BIN-TYPE RETAINING WALL
- ITEM 632.08020017- EXCAVATION FOR METAL BIN-TYPE RETAINING WALL
- ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL



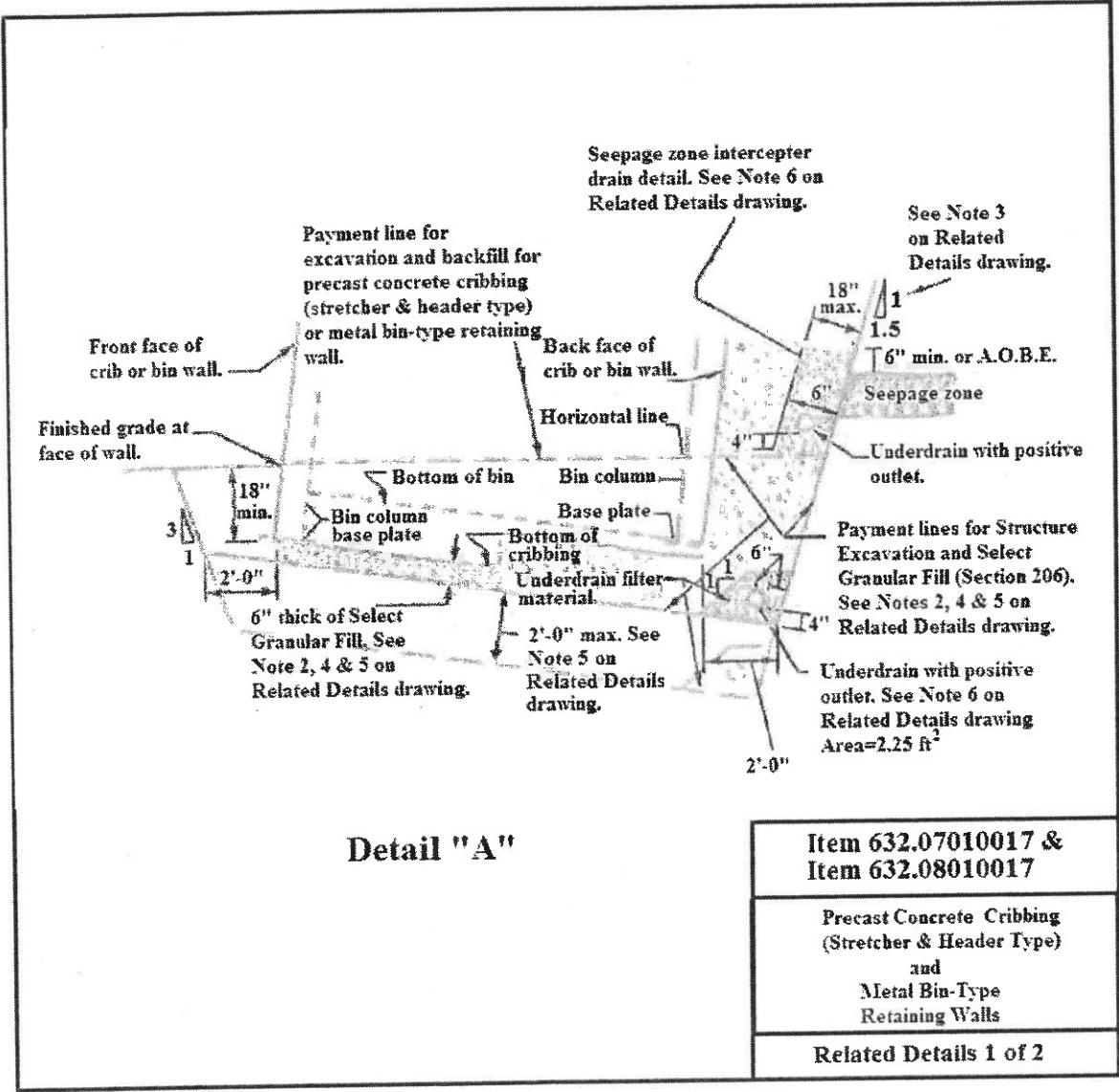
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- ITEM 632.08020017- EXCAVATION FOR METAL BIN-TYPE RETAINING WALL
- ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL



Bin Assembly at Front Column

Item 632.08010017
Metal Bin-Type Retaining Wall
Detail 2 of 2

- ITEM 632.07010017- PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
- ITEM 632.07020017- EXCAVATION FOR PRECAST CONCRETE CRIBBING (STRETCHER & HEADER TYPE) RETAINING WALL
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- ITEM 632.08030017- BACKFILL FOR METAL BIN-TYPE RETAINING WALL

Installation Notes

1. Placement of the fill material within the crib or bin walls shall be in accordance with the following:
 - A. Where the precast concrete crib or metal bins are to be filled with Stone Filling (Fine), the material shall be placed and compacted in a manner acceptable to the Engineer. Dumping of stone fill with a free fall greater than 2'-0" will not be permitted.
 - B. Where the precast concrete crib or metal bins are required to be filled with Select Granular Fill, the material shall be placed and compacted in accordance with Subsection 203-3.15 entitled "Fill and Backfill at Structures, Culverts, Pipes, Conduits, and Direct Burial Cables".
 - C. At no time shall the difference in backfill elevation between the interior and exterior of the wall exceed 4'-0".
 - D. The elevation of the backfill behind the wall shall not exceed the elevation of the fill material placed in the bins or cribs.
 - E. Placement of fill in the cribs or bins and backfill behind the wall shall closely follow erection of successive courses of units.
 - F. In computing the volume of precast concrete cribbing backfill, a deduction shall be made for the volume of concrete cribbing units. No deduction shall be made for the volume of the metal bin members.
2. Compaction requirements for Select Granular Fill behind and beneath walls shall be in accordance with Subsection 203-3.15 entitled "Fill and Backfill at Structures, Culverts, Pipes, Conduits, and Direct Burial Conduits". Stone Filling (Fine) shall be compacted in a manner acceptable to the Engineer.
3. If the Contractor elects not to lay the slope back as detailed, any excavation support system used must be designed in accordance with the geotechnical design procedures for flexible wall systems.
4. The Select Granular Fill shall be placed to provide uniform and adequate support of the base plates and/or bottom crib members at proper line, grade and batter. Shims or drift pins shall not be used to correct improper or inaccurate bedding.
5.
 - A. Undercutting to the maximum limits shown may be ordered by the Engineer where necessary to provide stable bedding conditions. Undercutting shall be paid for under Section 206.
 - B. If undercutting is ordered, the lift thickness and compaction requirements for the Select Granular Fill shall be as ordered by the Engineer.
 - C. The Regional Geotechnical Engineer shall be consulted if it appears that the undercutting beyond the 2'-0" max. depth may be needed. Special construction procedures and details will be shown on the plans when walls are to be located in areas where unsuitable material exists.
6. Seepage zones intercepting the excavation slope or the wall foundation area shall be positively drained by providing additional underdrain or underdrain filter material at the seepage zone. For marine installations or other special situations where the water level will be permanently above the finished grade at the wall face, the normal underdrain section shall be raised to a point 2'-0" above mean high water.
7. Wherever practical, construction shall be started at the lowest elevation on the profile and progressed up grade.
8. All bin or crib walls shall at all stages of their construction be true to line and grade. Any deviation from line and grade which in the judgement of the Engineer is either dangerous to the stability or detracts from the appearance of the wall shall be corrected by the Contractor at his/her own expense. All damaged portions of crib or bin walls from any cause whatsoever shall be replaced at the Contractors expense.

**Item 632.07010017 &
Item 632.08010017**

Precast Concrete Cribbing
(Stretcher & Header Type)
and
Metal Bin-Type
Retaining Walls

Related Details 2 of 2