



boomerang DESIGN
rethink, repurpose, results

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TOWN OF CLAYTON
CONFINED SPACE
NO WASTE DRAINS TO WATERWAYS

DUMP NO WASTE!
Ejw

DRAINS TO WATERWAYS
MADE IN USA

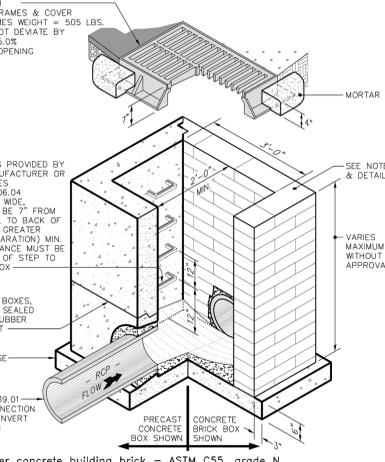
NCDOT 840.03 HOOD

NOTES:
1. See detail C06.01 for addition frame & cover detail.

TOWN OF CLAYTON
USE WITH THE TOWN OF CLAYTON STANDARD SPECIFICATIONS ONLY

STANDARD STORM DRAINAGE COVERS

SCALE: Not To Scale
REVISION DATE: July, 2010
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EDJW-4867-1
HEAVY DUTY FRAMES & COVER
COVER & FRAMES WEIGHT = 505 LBS.
WEIGHT MAY NOT DEVIATE BY
MORE THAN -5.0%
383 IN² NET OPENING

MORTAR COLLAR

PSI-PF STEPS PROVIDED BY
PRECAST MANUFACTURER OR
M.A. INDUSTRIES
SEE DETAIL C06.04
(MUST BE 16" WIDE,
INSTALLED TO BE 7" FROM
FACE OF WALL TO BACK OF
STEP AND NO GREATER
THAN 12" SEPARATION) MIN.
15" OF CLEARANCE MUST BE
FROM CENTER OF STEP TO
OUTSIDE OF BOX

FOR PRECAST BOXES,
JOINTS TO BE SEALED
WITH BUTYL RUBBER
JOINT SEALANT

EXTENDED BASE

SEE DETAIL 639.01
FOR PIPE CONNECTION
AND FORMED INVERT
CONSTRUCTION

PRECAST
CONCRETE
BOX SHOWN

CONCRETE
BRICK BOX
SHOWN

VARIES
MAXIMUM 8'-0"
WITHOUT ENGINEER'S
APPROVAL

SEE NOTES BELOW
& DETAIL 634.02

NOTES:
1. Use either concrete building brick - ASTM C55, grade N, type 1 or clay brick - ASTM C32, grade MS.
2. Mortar to be type M.
3. Concrete pipe to be class III
4. Precast boxes to conform to latest ASTM C-913
5. Precast boxes concrete strength to be a minimum 4,000 PSI at 28 days
6. See detail 634.02 for miscellaneous notes.
7. Top of precast box to be field adjusted using methods outlined in specifications.
8. This detail is a representation of the minimum standards for town of Clayton combination curb opening inlet & catch basin. Refer to NCDOT Std. Details 840.00, 840.14, 840.15, 840.16, 840.45, 840.46 & 840.52 for additional details and requirements. Other DOT catch basin standard details may be used with the approval of the Town Engineer. (i.e. in medians, ditches, & swales.)

TOWN OF CLAYTON
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TYPICAL DROP INLET DETAIL

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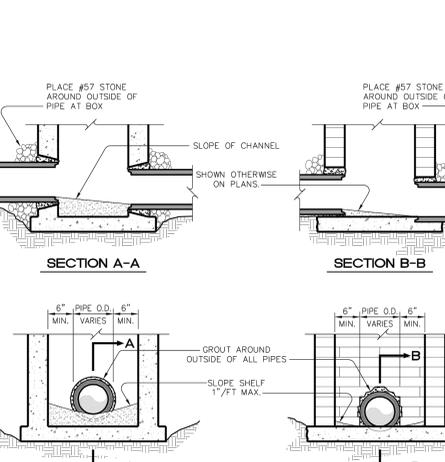
Drainage Structures Notes:
Unless more stringent requirements are called for on referenced NCDOT standard details, the following shall apply:

- Boxes may be reinforced masonry, masonry, precast concrete or cast-in-place reinforced concrete.
- Any non-standard box (non-standard meaning not shown in this manual), is to be designed by a NC Professional Engineer and approved by the Town Engineer.
- The maximum height of an unreinforced masonry drainage structure with 8" walls shall be limited to 8'-0" from invert of the outlet pipe to the top of the casting. Depths greater than 8'-0" shall have walls 12" thick. Basins over 12' in total depth shall be designed by a NC Professional Engineer and approved by the Town Engineer. Four inch walls are not allowed on drainage structures. Bottom slab on structures shall be reinforced when box depth exceeds 8 ft.
- Steps are to be provided on all basins deeper than 36".
- Steps are to be PSI-PF as manufactured by M. A. Industries or an approved equal. Locate on non-pipe walls. Steps shall meet OSHA requirements.
- Mortar in masonry boxes is to be type M.
- Clay brick structures are not allowed.
- Concrete pipe is to be minimum class III.
- Concrete building brick is to meet ASTM C-55, Grade N, Type 1 and must be NCDOT standard.
- All cast-in-place or precast concrete drainage structures located in paved areas accessible to truck loadings to be designed to meet AASHTO HS 20-44 loading. See manufacturers details for wall, top and bottom thickness.
- Inside of boxes shall allow for 6" of clearance on both sides of pipe. The dimension shown on the structures in this manual are minimum dimensions. For boxes with greater dimensions, either corbel walls, add a reinforced concrete top slab or lengthen box by adding additional grates & frames. Top and bottom slabs to be designed by NC Professional Engineer and approved by the Town Engineer for H20 loading.
- Maximum horizontal span of an 8" thick wall shall not exceed 8' for boxes of 8 feet or less in depth and 10 feet for boxes 12 feet or less in depth.

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DRAINAGE STRUCTURES NOTES

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PLACE #57 STONE AROUND OUTSIDE OF PIPE AT BOX

SLOPE OF CHANNEL

SECTION A-A

SECTION B-B

6" PIPE O.D., 6" MIN. VARIES MIN.

GROUT AROUND OUTSIDE OF ALL PIPES

SLOPE SHELF 1/2" MAX.

PRECAST BOX

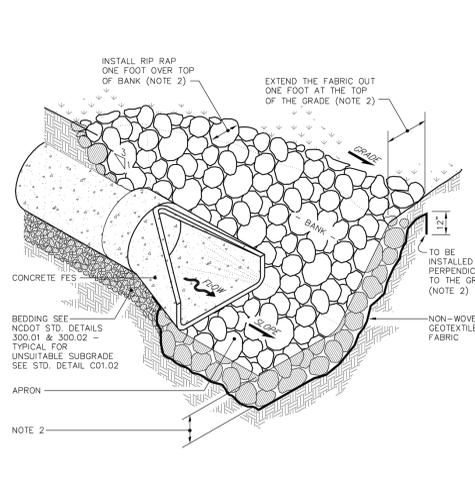
CONCRETE BRICK BOX

NOTES:
1. Invert to be a minimum of 3000 PSI at 28 days concrete.

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PIPE CONSTRUCTION INTO BOX AND FORMED INVERT DETAIL

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INSTALL RIP RAP ONE FOOT OVER TOP OF BANK (NOTE 2)

EXTEND THE FABRIC OUT ONE FOOT AT THE TOP OF THE GRADE (NOTE 2)

CONCRETE FEES

TO BE INSTALLED PERPENDICULAR TO THE GROUND (NOTE 2)

NON-WOVEN GEOTEXTILE FABRIC

REDDING SEE NCDOT STD. DETAILS 300.01 & 300.02 - TYPICAL FOR UNSUITABLE SUBGRADE SEE STD. DETAIL C01.02

APPRON

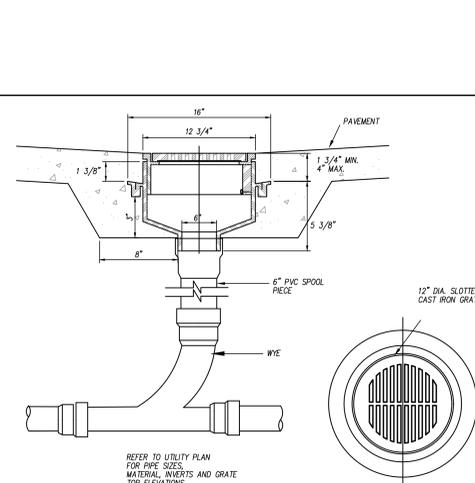
NOTE 2

NOTES:
1. Initial course of rip rap to be laid in excavated bed at side slopes. Rip-rap is not to be laid on top of grade of side slopes.
2. Comply with NCDENR Land Quality minimum requirements.

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END OF PIPE TREATMENTS

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16"

12 3/4"

PAVEMENT

1 3/8"

1 3/4" MIN. 4" MAX.

5 3/8"

5" PVC SPOOL PIECE

12" DIA. SLOTTED CAST IRON GRATE

WYE

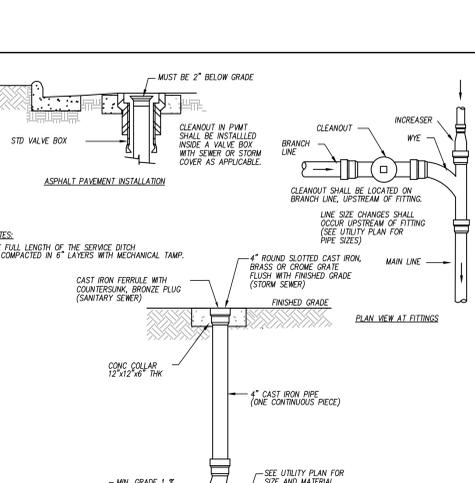
REFER TO UTILITY PLAN FOR PIPE SIZES, MATERIAL, INVERTS AND GRATE TOP ELEVATIONS

12" ADJUSTABLE MEDIUM DUTY FLOOR DRAIN N.T.S.

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TYPICAL DROP INLET DETAIL

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MUST BE 2" BELOW GRADE

STD VALVE BOX

CLEANOUT IN PAVT SHALL BE INSTALLED INSIDE A VALVE BOX WITH SEWER OR STORM COVER AS APPLICABLE

ASPHALT PAVEMENT INSTALLATION

CLEANOUT IN BRANCH LINE SHALL BE LOCATED ON BRANCH LINE, UPSTREAM OF FITTING.

LINE SIZE CHANGES SHALL OCCUR UPSTREAM OF FITTING (SEE UTILITY PLAN FOR PIPE SIZES)

INCREASER

WYE

4" ROUND SLOTTED CAST IRON, BRASS OR CHROME GRATE FLUSH WITH FINISHED GRADE (STORM SEWER)

FINISHED GRADE

PLAN VIEW AT FITTINGS

CONIC COLLAR 12"x12"x6" THK

4" CAST IRON PIPE (ONE CONTINUOUS PIECE)

MIN. GRADE 1 X

SEE UTILITY PLAN FOR SIZE AND MATERIAL

COMBINATION LONG TURN PATTERN 7 AND 1/8" BEND

BARREL OF PIPE TO REST ON UNDISTURBED SOIL

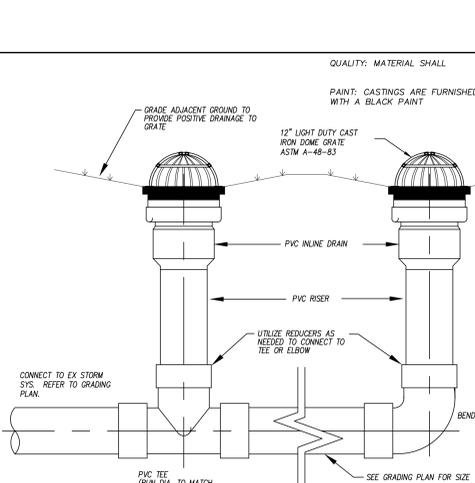
NOTES:
THE FULL LENGTH OF THE SERVICE DITCH BE COMPACTED IN 6" LAYERS WITH MECHANICAL TAMP.

ROOF DRAIN CLEANOUT N.T.S.

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DRAINAGE STRUCTURES NOTES

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QUALITY: MATERIAL SHALL

PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT

GRADE ADJACENT GROUND TO PROVIDE POSITIVE DRAINAGE TO GRATE

12" LIGHT DUTY CAST IRON DOME GRATE ASTM A-48-83

PVC INLINE DRAIN

PVC RISER

UTILIZE REDUCERS AS NEEDED TO CONNECT TO TEE OR ELBOW

CONNECT TO EX STORM SYS. REFER TO GRADING PLAN.

PVC TEE (RUN DIA. TO MATCH DOWNSTREAM PIPE SIZE)

BEND

SEE GRADING PLAN FOR SIZE

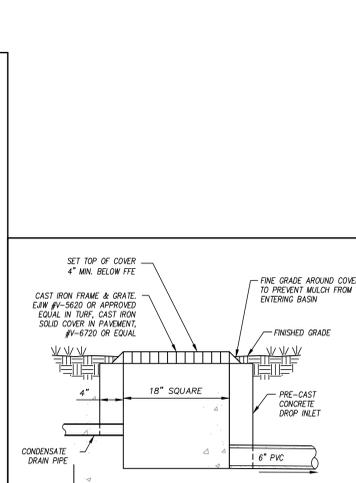
NOTES:
1. INLINE DRAINS SHALL BE AS MANUFACTURED BY NYLOPLAST OR APPROVED EQUAL.
2. REFER TO GRADING PLAN FOR PIPE SIZES AND ELEVATIONS.

12-INCH CAST IRON DOME GRATE AND INLINE DRAIN BASIN N.T.S.

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PIPE CONSTRUCTION INTO BOX AND FORMED INVERT DETAIL

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SET TOP OF COVER 4" MIN. BELOW FTE

CAST IRON FRAME & GRATE EJM #4-5620 OR APPROVED EQUAL IN TUFF. CAST IRON SOLID COVER IN PAVEMENT. #4-9220 OR EQUAL.

FINE GRADE AROUND COVER TO PREVENT MULCH FROM ENTERING BASIN

FINISHED GRADE

PRE-CAST CONCRETE DROP INLET

6" PVC

1% MIN. SLOPE TO ROOF DRAIN SYSTEM

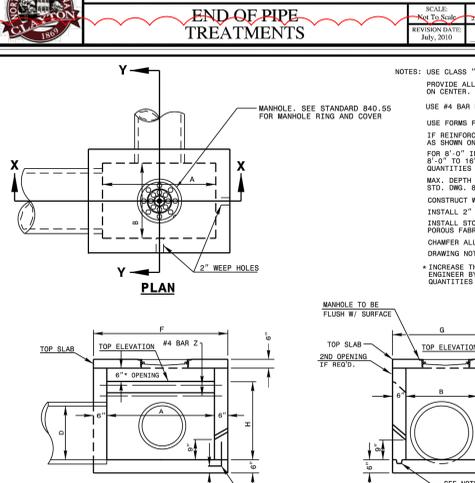
CONDENSATE DRAIN PIPE

CONDENSATE RELIEF BASIN N.T.S.

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PIPE CONSTRUCTION INTO BOX AND FORMED INVERT DETAIL

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MANHOLE. SEE STANDARD 840.55 FOR MANHOLE RING AND COVER

3" WEEP HOLES

PLAN

TOP SLAB

TOP ELEVATION

#4 BAR Z

6" OPENING

SECTION X-X

SECTION Y-Y

TOP SLAB

TOP ELEVATION

#4 BAR Z

2ND OPENING (IF REQ'D.)

TOP ELEVATION

6" CLR. (MIN.)

PIPE WALL (THICKNESS VARIES)

#4 BAR Z

PART SECTION Y-Y SHOWING DETAILS AT OPENING

NOTES:
USE CLASS "B" CONCRETE THROUGHOUT.
PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.06.
USE #4 BAR DOWELS AT 12" CENTERS
USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
FOR 8" OR 12" HIGH INVERTS OR STEPS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.
MAX. DEPTH OF THIS STRUCTURE FROM TOP OF BOTTOM SLAB TO TOP ELEVATION IS 16'-0". STD. DWG. 840.45 OR 840.46 CONTROLS MAX. DEPTH IF PRECAST BOX IS USED.
CONSTRUCT WITH PIPE CHIMNEY MATCHINGS.
INSTALL 2" WEEPHOLES AS DIRECTED BY THE ENGINEER.
INSTALL STONE DRAINS, OF A MINIMUM OF 1 CURB FOOT OF NO. 78M STONE IN A POROUS FABRIC BAG OR MAT, AT EACH WEEP HOLE OR AS DIRECTED BY THE ENGINEER. CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.
* INCREASE THE SIZE OF THE 6" OPENING TO 8" MAX., AS DIRECTED BY THE ENGINEER BY ADDING 2" TO THE WALL HEIGHT ABOVE THE TOP ELEVATION. ADJUST QUANTITIES ACCORDINGLY.

MIN. DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H)

PIPE DIA.	SPAN	WIDTH	HEIGHT	REINFORCING		TOP & BOT. SLAB DIMENSIONS	CU. YDS. CONC.	TOTAL QUANTITIES	DEDUCTION ONE PIPE (PERCENT)	NET QUANTITY							
				BAR#	W						SAFES	Z					
12"	3'-0"	2'-3"	1'-10"	8	3'-8"	4	3'-0"	4	3'-0"	0.207	0.271	0.250	47	1,048	0.015	0.032	0.046
15"	3'-0"	2'-3"	2'-11"	8	3'-8"	4	3'-0"	4	3'-0"	0.207	0.271	0.250	47	1,048	0.023	0.036	0.046
18"	4'-0"	2'-8"	2'-4"	8	3'-0"	5	3'-5"	7	4'-0"	0.278	0.340	0.284	61	1,379	0.033	0.040	0.053
24"	4'-0"	2'-8"	2'-10"	8	3'-0"	5	3'-5"	7	4'-0"	0.278	0.340	0.284	61	1,379	0.059	0.065	0.053
30"	4'-0"	3'-6"	3'-4"	8	3'-0"	5	4'-0"	8	4'-0"	0.363	0.472	0.375	77	1,918	0.092	0.127	0.053
36"	4'-0"	4'-0"	3'-8"	8	3'-0"	5	4'-0"	8	4'-0"	0.445	0.510	0.362	84	2,390	0.132	0.178	0.059
42"	8'-0"	4'-6"	4'-4"	8	3'-0"	5	5'-3"	12	8'-0"	0.847	0.811	0.369	119	2,914	0.180	0.243	0.066
48"	8'-0"	6'-0"	4'-10"	8	3'-0"	5	6'-0"	13	8'-0"	0.903	0.666	0.425	128	3,298	0.233	0.317	0.066

ROADWAY STANDARD DRAWING FOR CONCRETE OPEN THROAT CATCH BASIN (WITH MANHOLE) 12" THRU 48" PIPE

840.04

TOWN OF CLAYTON
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END OF PIPE TREATMENTS

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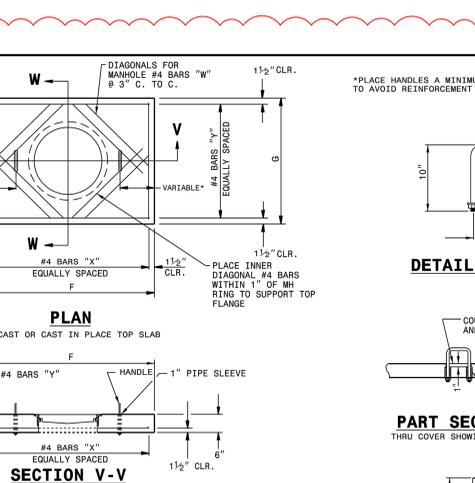
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DIAGONALS FOR MANHOLE #4 BARS "W" 1 1/2" CLR.

34" RAD.

2 - 3" X 1/4" THICK ROUND OR SQUARE CUT WASHER

2 - HEX NUT

DETAIL OF HANDLE

COUNTERSINK PART WHERE HANDLE IS LOCATED 1" AND ALLOW HANDLE TO MOVE VERTICALLY.

1" PIPE SLEEVE X 5" LONG.

PART SECTION THRU COVER SHOWING HANDLE

PLAN

PRECAST OR CAST IN PLACE TOP SLAB

#4 BARS "W" EQUALLY SPACED

HANDLE

1" PIPE SLEEVE

#4 BARS "X" EQUALLY SPACED

SECTION V-V

1 1/2" CLR.

SECTION W-W

1 1/2" CLR.

#4 BARS "W" EQUALLY SPACED

#4 BARS "X"

DOWEL

1 1/2" CLR.

6"

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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR CONCRETE OPEN THROAT CATCH BASIN (WITH MANHOLE) 12" THRU 48" PIPE

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Town of Clayton Planning Department

Planning Director:

Official Document

This document has been reviewed by the Town of Clayton staff to the best of our knowledge and belief, conforms to all laws, ordinances, policies and specifications that are applicable. Approval by the Town of Clayton does not relieve the Applicant and/or Design Professional from the responsibility for obtaining all permits or licenses or compliance with the applicable codes and specifications and meeting all applicable standards and regulations.

BID DOCUMENTS

PROJECT PHASE

2307

BOOMERANG DESIGN PROJECT NUMBER

02.07.24

DRAWING RELEASE DATE

DETAILS

SHEET TITLE

C708

SHEET

COOPER ACADEMY A & R

PROJECT TITLE

"CLIENT'S PROJECT" # - XXX

SEAL 022625

ENGINEER

STEVEN J. MILLER

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REVISIONS

NO.	DATE	DESCRIPTION
1	2/20/24	ADDENDUM #1