Concrete Batch Plant Control Plan

For the

Tappan Zee Hudson River Crossing

Revision 2
April 11, 2014

Prepared by

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Document History			
Issue Date	**Description**	**By**	**Revision**
10/11/2013	Submit to NYSTA	JK	0
12/13/2013	Submit to NYSTA addressing comments	JK	1
4/11/2014	Submit to NYSTA addressing comments	JK	2

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Appendices

1.0 Introduction

This Concrete Batch Plant Control Plan (CBPCP) serves to establish the means and methods to minimize and/or mitigate potential adverse effects related to concrete production, delivery & placement, associated with the Tappan Zee Hudson River Crossing Project (Project). The CBPCP was prepared specifically to meet:

- the Project permit condition #18 detailed in the Project New York State Department of Environmental Conservation (NYSDEC) Permit for Construction (Facility DEC ID 3-9903-00043/00012 through 00014); and

- the Project concrete environmental performance commitments (EPC) provided in Exhibit B Item 1.(F). and Item 12 of the Conformed November 2012 Part 3, Section 3 – Environmental Compliance Section of the Tappan Zee Hudson River Crossing Project DB Contract Documents (Contract No. D214134) (DB Contract Documents).

The CBPCP will be implemented from commencement through the duration of construction of the Project.

2.0 Project Concrete Requirements

2.1 Project NYSDEC Permit for Construction – Permit Condition #18

At least 45 days before concrete is used for the Authorized Activity the Permittee must submit plans and descriptions of the means of concrete production, delivery and placement. Discharge of concrete and concrete leachate is prohibited. In-water concrete production, delivery and placement, and actions preliminary to same, may start when the Department has given written approval of these plans. The Permit authorizes no withdrawal of water from the Hudson River than may require a permit from the Department pursuant to 6NYCRR Part 601.

This CBPCP has been prepared to provide to the NYSDEC the plans and description of the means of concrete production, delivery and placement. Please see Section 3.0 for further details.

2.2 Project DB Contract Documents Concrete EPCs

2.2.1 Exhibit B Item 1. Air Quality Control

F. The use of concrete batch plant controls. The concrete batch plant will vent the cement weigh hopper, gathering hopper, and mix loading operations to a baghouse or filter sock. Venting storage silo chutes to a baghouse shall have a control efficiency of at least 99.9 percent. Roadways at the concrete batch plant, and all unloading and loading material handling operations, shall have a dust control plan providing at least a 50 percent reduction in PM10 and PM2.5 emissions from fugitive dust through wet suppression.

- Two concrete batch plants will be positioned on separate barges. Along with the concrete batch plants, there will be two sets of barges that will deliver the aggregate, cement and water supply. Per the DB Contract Document requirements, the concrete batch plants will consist of the following material transfer points that are enclosed and vented to a Dust Collection system with a baghouse or filter sock:

    - the cement weigh hopper (gathering hopper for cementitious materials);

    - mix loading operations to a baghouse or filter sock; and

- the batch drop point.

In addition, the storage silos on the concrete batch plant barges and the supply barges will also vent to a Dust Collection system with a baghouse or filter sock. The silos on the concrete batch plant barges each have a separate Dust Collection system. The supply barge has one centrally located Dust Collection system for the three silos on the supply barge. Venting storage silo chutes to a baghouse shall have a control efficiency of at least 99.9 percent. Therefore, based on NYSDEC Regulations: Subpart 201-3:Item 37, the Project is exempt from obtaining a permit for the concrete batch plants. Subpart 201-3:Item 37 states that "Concrete batch plants where the cement weigh hopper and all bulk storage silos are exhausted through fabric filters, and the batch drop point is controlled by a shroud or other emission control device" are exempt from permitting activities.

The Control Data Sheet for the Dust Collection system, including the efficiency of the baghouse, is provided as Appendix A.

In addition, an airflow diagram of the dust collection system for the concrete batch plant and supply barges is provided in Drawing GA102 in Appendix B.

2.2.2 Exhibit B Item 10. Energy Conservation and Renewable Energy

D .Efforts and measures to reduce concrete waste, such as pouring leftover concrete as blocks or sidewalk slabs for later use where practicable.

Where leftover concrete can be cast into blocks or sidewalk slabs, this option will be evaluated. However, the concrete batch plant barge will be located near the concrete pour location and the concrete batch size can range from 1-6 cubic yards (CY). Therefore, the primary method of reducing the concrete waste will be control of the concrete pour. The ability to place the concrete batch plant barge near the concrete pour location results in better management and drastic reductions of the concrete waste stream as compared to typical construction projects.

2.2.3 Exhibit B Item 12. Concrete

A. Submit to the Authority plans and descriptions of the means of concrete production, delivery and placement at least 60 days before concrete is to be used. These plans shall to the maximum extent practicable prevent the discharge of cement into the River.

This CBPCP has been prepared to provide to the Authority the plans and description of the means of concrete production, delivery and placement. Please see Section 3.0 for further details.

B. Water from piling and cofferdam dewatering operations shall be discharged into a silt curtain or similar containment. The discharge shall not cause a substantial visible contrast to natural conditions in the Hudson River outside the containment. Comply with Exhibit B Item 6 herein as appropriate.

As stated in the January 21, 2014 NYSDEC email correspondence to the New York State Thruway Authority (NYSTA), the NYSDEC recommends that this requirement be reconsidered. The use of silt curtains is not a requirement of the NYSDEC Project permit condition #18. Furthermore, the NYSDEC questions the necessity and efficacy of silt curtains for these operations. Therefore, as acknowledged in NYSTA Letter TA_TZC_04510_COR_ENV in response to TZC Letter LT_TZC_NYSTA_00411, TZC will not be discharging water from piling and cofferdam dewatering operations into a silt curtain. TZC has committed to monitoring the discharge from pile dewatering activities to confirm compliance with NYSDEC Project permit condition #16, which states "Water

from pile and cofferdam dewatering installations may cause no increase in turbidity that results in a substantial visible contrast to the Hudson River outside the piling or cofferdam. As described in the Final Environmental Impact Statement the discharge must be treated if necessary to prevent such substantial visible contrast."

C. *Ensure that no water containing fresh concrete or concrete leachate shall be discharged into the Hudson River.*

Water within the formwork, if any, will be pumped out of the formwork prior to the placement of concrete and placed directly back into the Hudson River.

Water containing fresh concrete or concrete leachate will not be discharged in the Hudson River. At the end of the last pour of each day, when batching is completed and before the crew leaves, the Plant mixing unit, re-mixer, pump and placing boom system will be washed down. The process will start at the top with the mixer then on down to the pump. The wash water will be contained within the mixer, re-mixer and pump. Once the wash water has made it to the pump it will be diverted and pumped across the deck to waste bins that will collect the waste water. All excess material and water on the deck of the barge from washing down the equipment will be pushed into two sump areas near the plant to be pumped into waste bins. This area of the barge has the containment curb. (See Drawing GA100 in Appendix B for approximate location of containment curb.) The containment area capacity of the concrete batch plant barge is approximately 9,510 gallons. On an as needed basis, a crane will pick the waste bins off the concrete batch plant barge and place them on a shuttle barge which will take them to land, where the water will be pumped into a vacuum truck for proper off-site disposal.

D. *Water withdrawals from New York State waters for the purpose of manufacturing concrete are prohibited.*

At no time will water be withdrawn from the Hudson River for the purpose of manufacturing concrete. Water will be delivered by barge from shore in tanks on the supply barge.

E. *Wastewater discharge into waters of New York State from the manufacturing of concrete is prohibited.*

Wastewater from the manufacturing of concrete will not be discharged into the Hudson River. At the end of the last pour each day, when batching is completed and before the crew leaves, the Plant mixing unit, re-mixer, pump and placing boom system will be washed down. The process will start at the top with the mixer then on down to the pump. The wash water will be contained within the mixer, re-mixer and pump. Once the wash water has made it to the pump it will be diverted and pumped across the deck to waste bins that will collect the waste water. All excess material and water on the deck of the barge from washing down the equipment will be pushed into two sump areas near the plant to be pumped into waste bins. This area of the barge has the containment curb. (See Drawing GA100 in Appendix B for approximate location of containment curb.) The containment area capacity of the concrete batch plant barge is approximately 9,510 gallons. On an as needed basis, a crane will pick the waste bins off the concrete batch plant barge and place them on a shuttle barge which will take them to land, where the water will be pumped into a vacuum truck for proper off-site disposal.

3.0 Concrete Production, Delivery & Placement.

As discussed above, two X-Tec Twin Shaft concrete batch plants will be positioned on separate barges and will be pushed near that day's desired pour location for concrete production. Along with the concrete batch plants, there will be two sets of barges that will deliver the aggregate, cement and water supply. These

barges will be positioned next to the concrete batch plants for production. (See Drawing GA103 in Appendix B for the barge layout in production.

Barges will be fleeted next to each other when transferring material. The maximum distance between barges will vary but will not exceed the length of hose that will be used to transfer material. The intended and best practice distance is 2 to 3 feet to eliminate supporting the hoses between barges.

3.1 Production Measures

Below is a description of the contents, containment measures and transfer operations for the aggregate, cement and water supply barges.

- **Aggregate Barge (See Drawing GA105-106 in Appendix B)**
    - TZC aggregate barges have an approximately 3 to 5 feet tall containment curb that will encompass the aggregate barge but will have slits for rain drainage. The aggregate containment curb keeps the aggregate material (i.e., rock or sand) on the barge during delivery and also throughout the unloading process.
    - The aggregate barge will be located next to a concrete batch plant barge and the aggregate will be unloaded onto partially covered conveyor belts on the concrete batch plant barge using a Caterpillar (CAT) 345 Material Handler with a Peirce Pacific Clamshell Bucket designed for small aggregate handling. The clamshell bucket has a tight sealing bucket design and is ideal for over the water use.
    - Periodically the aggregate barges will be wetted down, as needed, to provide and address dust control and as required for aggregate moisture control to insure concrete quality control measures.

- **Supply Barge (See Drawing GA104 in Appendix B)**
    - The supply barge will have three cementitious silos, a fresh water tank, admixture tanks and a Dust Collection system. The Dust Collection system on the supply barge is centrally located for collection of dust from the three silos. An airflow diagram of the dust collection system on the supply barge is provided in Appendix B.
    - The three silos will either hold cement, slag, or flyash or a preblended ration of these materials. The silos will not be used to hold concrete.
    - When transferring cementitious material to and from the supply barge, the vented air will be captured in a Dust Collection system connected to the silos. The Dust Collection system has a 99.9 percent efficiency rating (see Appendix A).
    - When transferring cement, slag or fly ash from the supply barge to the silos on the concrete plant barge, black softwall 50-75 Psi WP hoses will be used. The connection or hook will be over the barge not the water. This will allow any product, if a leak were to occur, to be contained to the barge.
    - The hose couplings are (cam lock) type (see detail in Appendix C). They are an industry standard transfer hose connection and incorporate a rubber gasket to create an air tight seal.

- Water will be delivered by barge from shore in tanks on the supply barge to a water tank on the concrete plant barge and will not be withdrawn from the Hudson River. Water will be transferred from the supply barge to the concrete batch plant using steel lined hoses.
- TZC will install an approximately 4 to 6 inches tall containment curb with a capacity of approximately 6,480 gallons that will encompass the entire area where concrete admixture liquids are stored on the supply barge.

- **Concrete Batch Plant Barge (See Drawing GA100,101 & 103 in Appendix B)**

  - Material transfer on the concrete batch plant barge from material storage location (i.e., silos, water tanks) will occur through transfer hoses or material augers in a closed system to continuously contain the material.
  - The transferring of cementitious material is a closed system starting at the storage silos on the supply barge and continuing to an enclosed cement weigh hopper and mixer on the concrete batch plant barges. The silos on the concrete batch plant barge will all have separate Dust Collection systems. In addition, there will be a Dust Collection system on the cement weigh hopper right before the material enters the mixer. The Dust Collection systems have a 99.9 percent efficient rating (see Appendix A)
  - Batched concrete prepared on the concrete batch plant barge will be discharged from the twin shaft mixer into an 18 CY Maxon Re-mixer holding vessel underneath the concrete batch plant to be agitated until it's ready to be placed.
  - At the end of the last pour of each day, when batching is completed and before the crew leaves, the Plant mixing unit, re-mixer, pump and placing boom system will be washed down. The process will start at the top with the mixer then on down to the pump. The wash water will be contained within the mixer, re-mixer and pump. Once the wash water has made it to the pump it will be diverted and pumped across the deck to waste bins that will collect the waste water. All excess material and water on the deck of the barge from washing down the equipment will be pushed into two sump areas near the plant to be pumped to waste bins. This area of the barge has a containment curb. (See Drawing GA100 in Appendix B for approximate location of containment curb.) On an as needed basis, a crane will pick the waste bins off the concrete batch plant barge and place them on a shuttle barge which will take them to land, the water will be pumped into a vacuum truck for proper off-site disposal.
  - TZC will install an approximately 4 to 6 inches tall containment curb that will encompass the entire area where concrete admixture liquids and concrete wash water are stored on the barge. The containment area capacity of the concrete batch plant barge is approximately 9,510 gallons.

3.2 Delivery Measures

Concrete will be delivered from the concrete batch plant barge to the final placement location through the use of either a placing boom system that will include a hose or a bucket. Each of these delivery methods are explained below.

- **Hose:** Each of the concrete batch plant barges is equipped with Putzmeister MX 43 Meter (138'1") Placing Boom and Pumping System. The concrete is pumped from the re-mixer through steel pipe continuously as it travels across the deck of the barge and up the placing boom. Once the concrete reaches the end of the placing boom line it exits to the pour location through the manufacturers recommended flexible rubber hose. At the start of each shift, the hose and couplings will be visually inspected for leaks. The placing boom systems have a pneumatic valve (Air Cuff) integrated in the end hose that allows TZC to close off the flow of concrete completely once the pump is turned off. This valve is located at the end of the pump line for the best control in shutting off the concrete. See Appendix D for pneumatic valve (Air Cuff) information.

- **Bucket:** When a concrete bucket is used to deliver concrete to a pour location, the bucket will be placed next to the re-mixer so that the chute on the re-mixer can be swung and divert concrete from the pump to the bucket. Before the bucket is swung over the water, the bucket will be visually inspected for concrete outside of the bucket. Bucket types vary but all buckets will have a manual lever with clamshell jaws that will be opened to discharge the concrete. With proper maintenance and care the bucket's clamshell type jaws can remain nearly leak proof. See Appendix D for bucket details.

- Cleaning of all concrete equipment is within the containment curb area of the barge. The placing boom system will be cleaned with a sponge ball that is sucked back through the line to the pump to remove all concrete. The concrete buckets will be washed off inside the containment curb area. The concrete waste will be collected in the sump areas of the barge then placed on roll of containers for disposal.

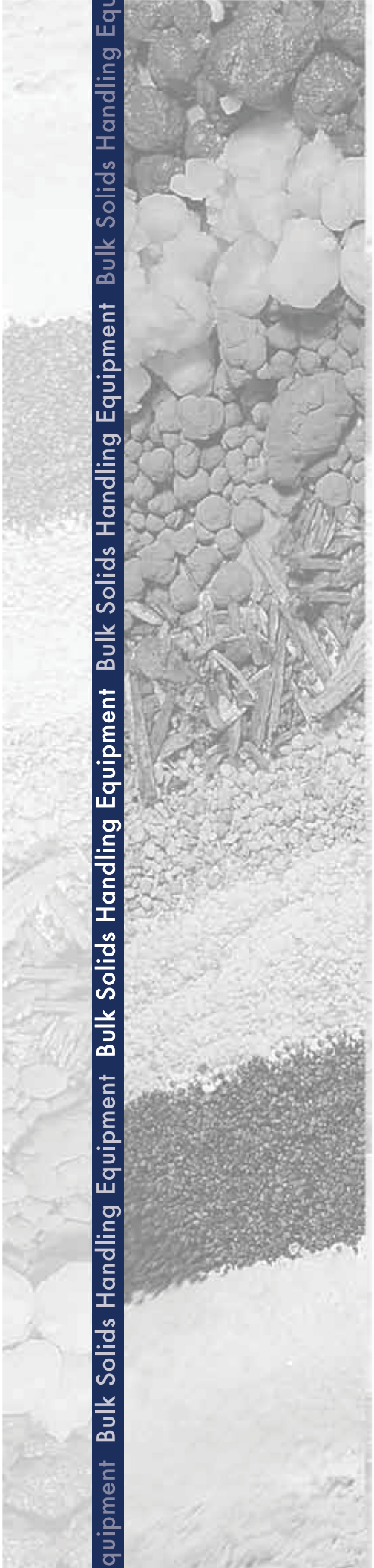
3.3 Placement Measures

When placing concrete, controlled methods will be used in cofferdams, pipe piles and other formwork to avoid spillage and leakage into the water. Sealants, gaskets and/or other industry proven methods will be used to seal the formwork to prevent concrete leakage. See Appendix E for monotube jacket with neoprene cut sheet for sealing around pipe pile. Once formwork is sealed, water within the formwork, if any, will be pumped out of prior to the placement of concrete and placed directly back into the Hudson River. When the placement of concrete in the formwork is nearing the end, concrete placement will be closely monitored and concrete will be added in small increments to prevent spillage.

APPENDICES

APPENDIX A

Dust Collection System



WAMECO™Front

Round Dust Collectors with Elements Replaceable through Front Door

Rundfilter mit rohgasseitig austauschbaren elementen

Filtres ronds avec des éléments extractibles de front

Filtri tondi con elementi estraibili frontalmente

WAMGROUP

WAM®

Description

The WAMECO™ Front Dust Collector range having elements that can be unscrewed from the dirty side is used where access to the filter elements from the clean air side is not possible either because of limited headroom or a top-mounted fan.

Beschreibung

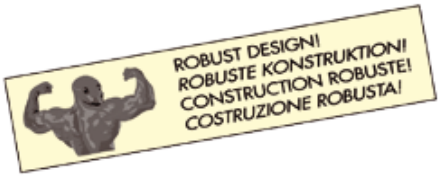
Die WAMECO™ Front Filter-Baureihe mit rohgasseitig eingeschraubten Filtereinsätzen findet dort Verwendung, wo ein reingasseitiger Zugang zu den Einsätzen entweder aufgrund geringer Deckenhöhen oder wegen eines Aufsatz-Absaugventilators nicht möglich ist.

Déscription

La gamme des filtres WAMECO™ Front à éléments dévissables a été conçue pour répondre aux exigences d'installations dans lesquelles l'espace en hauteur est trop exigu ou bien pour les filtres avec aspirateur dans le but de simplifier les opérations d'entretien.

Descrizione

La gamma dei filtri WAMECO™ Front ad elementi svitabili è stata studiata per soddisfare le esigenze di impianti in cui vi sia spazio ridotto in altezza o per filtri con aspiratore per semplificare le operazioni di manutenzione.



Highly efficient door fasteners, 4 locking clamps in 304 st.st.

Hoch wirksame Türbefestigung. 4 Schnellverschlüsse aus Edelstahl 1.4301

Fixation parfaite du portillon. 4 crapauds de fermeture en inox 304

Perfetto fissaggio portello. 4 ganci di chiusura (AISI 304)

Dustproof guarantee (EPDM gasket 15 mm thick)

Garantiert staubdicht (EPDM-Dichtung, 15 mm stark)

Étanchéité à poussière garantie (garniture EPDM épaisseur 15 mm)

Tenuta polvere garantita (guarnizione EPDM spess. 15 mm)

No dust deposits (304 stainless steel insert)

Keine Staubrückstände (1 .430 l-Edelstahleinsatz)

Aucune stagnation de poussière (plaque en inox 304)

Nessun ristagno polvere (piatto in AISI 304)

Sturdy door, 304 stainless steel, 2mm thickness

Stabile Tür aus Edelstahl 1.4301, 2 mm stark

Portillon résistant, inox 304, épaisseur 2 mm

Portello resistente, AISI 304 spessore 2 mm

Robust body, 304 stainless steel, 1.5 mm thickness

Robustes Gehäuse aus Edelstahl 1.4301, 1,5 mm stark

Corps intermédiaire robuste, inox 304 épaisseur 1,5 mm

Corpo intermedio robusto, AISI 304 spessore 1,5 mm

Easy door locking. Floating 304 stainless steel hinges.

Vereinfachte Türverriegelung. Schwimmend gelagerte. Schamiere aus Edelstahl 1.4301

Fermeture portillon simplifiée. Charnières flottantes en inox 304.

Chiusura portello semplificata. Cerniere flottanti (AISI 304).

Features
- Robust design
- 304 stainless steel inspection door insert + 15mm (0.6 in) EPDM door gasket
- Large inspection door
- Floating stainless steel hinges on side of door, high-quality fasteners on opposite side

Merkmale
- *Robuste Konstruktion*
- *1.4301 Edelstahleinsatz in Inspektionstür + 15mm EPDM-Dichtung*
- *Große Inspektionstür*
- *Schwimmend gelagerte, seitliche Edelstahl-Türscharniere, Qualitäts-Schnellverschlüsse auf der gegenüberliegenden Seite*

Caractéristiques
- *Construction robuste*
- *Plaque de renfort en inox 304 sur trappe de vi site + joint en EPDM de 15 mm d'epaisseur*
- *Trappe d'inspection de grandes dimensions*
- *Charnieres flottantes latérales en inox, crapouds de fermeture de haute qualité sur côté opposé*

Caratteristiche
- *Costruzione robusta*
- *Piastra di rinforzo in AISI 304 sul portello d'ispezione + guarnizione in EPDM da 15 mm di spessore*
- *Portello d'ispezione di grandi dimensioni*
- *Cerniere flottanti laterali in AISI, ganci di chiusura di alta qualità sul lato opposto*

Function
- No deformation
- Perfect door sealing; no dust deposits inside the dust collector
- Easy access to filter elements for removal and reassembly
- Door remains always attached to dust collector body; easy door locking

Funktion
- *Keine Deformation*
- *Perfekte Türabdichtung; keine Staubablagerungen im Filterinneren möglich*
- *Zum Austausch leicht zugängliche Filterelemente*
- *Inspektionstür bleibt zu jeder Zeit mit dem Filtergehäuse verbunden Tür leicht zu schließen*

Fonction
- *Aucune déformation*
- *Parfaite étanchéité; aucune rétention de poussiére à l'inrérieur du filtre*
- *Accès facile aux éléments filtrants pour leur remplacement*
- *Trappe toujours solidaire du corps du filtre; fermeture facile de la trappe*

Funzione
- *Nessuna deformazione*
- *Tenuta perfetta; nessun ristagno di polvere all'interno del filtro*
- *Facile accesso agli elementi filtranti per la loro sostituzione*
- *Portello resta sempre unito al corpo del filtro*
- *Facile chiusura del portello*

Benefits
Reduced operating costs due to longer durability

Safe and dustproof operation
Hygienic operation

Easy money-saving maintenance

Easier and safer maintenance

Vorteile
Geringere Betriebskosten dank längerer Standzeiten

Sicherer staubfreier Betrieb
Hygienischer Betrieb

Einfache kostensparende Wartung

Leichte und sichere Wartung

Avantages
Faible coût de maintenance grâce à la durée prolongée

Entretien facile; hygiène élevée de travail

Maintenance facile à coût bas

Ambiance de travail saine

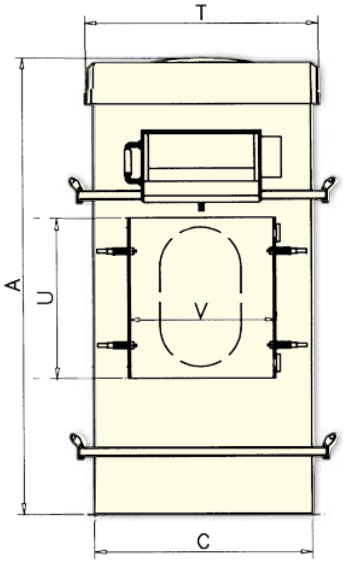
Vantaggi
Costi ridotti grazie alla durata prolungata

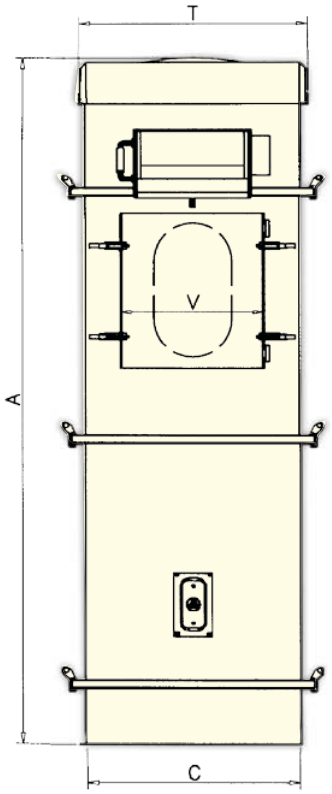
Funzionamento sicuro in assenza di polvere
Elevata igiene di lavoro

Facile manutenzione a basso costo

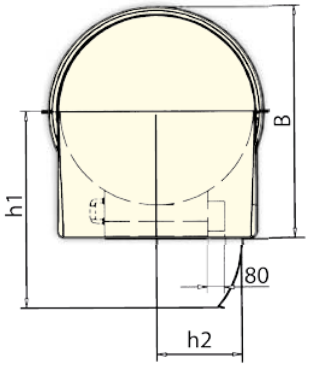
Manutenzione facile e sicura

FILTER *FILTER* *FILTRE* *FILTRO* Ø(mm)	CARTRIDGES *PATRONEN* *CARTOUCHES* *CARTUCCE* FILTER SURFACE *FILTERFLÄCHE* *SURFACE FILTRANTE* *SUPERFICIE FILTRANTE*	ROUND BAGS *SCHLÄUCHE* *MANCHES* *MANICHE* FILTER SURFACE *FILTERFLÄCHE* *SURFACE FILTRANTE* *SUPERFICIE FILTRANTE*
400	3 - 4 - 5 m²	1 - 2 - 3 m²
600	7 - 11 - 13 m²	3 - 5 - 6 m²
800	12 - 20 - 24 m²	6 - 8 - 11 m²
1000	25 - 39 - 47 m²	11 - 16 - 21 m²





FS	FB	A	B	C	T	U	V	h1	h2	kg	
										FS	FB
FSIJ 03		1190	670	408	460	400	430	510	370	39	
FSIJ 04		1440				660				43	
FSIJ 05	FSIJ 01	1590				660				45	47
	FSIJ 02	2030				660					50
	FSIJ 03	2510				660					55
FS2J 07		1190	870	603	650	400	550	740	440	64	
FS2J 11		1440				660				72	
FS2J 13	FS2J 03	1590				660				77	59
	FS2J 05	2030				660					67
	FS2J 06	2510				660					72
FS3J 12		1240	960	783	830	400	650	940	490	94	
FS3J 20		1440				660				112	
FS3J 24	FS3J 06	1590				660				118	84
	FS3J 08	2030				660					102
	FS3J 11	2510				660					108
FS4J 25		1240	1210	1038	1090	400	680	1150	460	151	
FS4J 39		1440				660				175	
FS4J 47	FSAJ 11	1590				660				187	186
	FSAJ 16	2030				660					160
	FSAJ 21	2510				660					172



063001520 December 2010

Further Products - Weitere Produkte - Autre production - Altra produzione

063001481

063001431

WAM. 03505

063001487

063001505

063001508

Bulk Solids Handling Equipment Bulk Solids Handling Equipment Bulk Solids Handling Equipment Bulk Solids Handling Equipment Bulk Solids Handling Equipment

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INFORMATION ABOUT DUST PROTECTION

In general we want to inform you that all technical possible protections to avoid dust and outflow of material are included so that a perfect production in relation of environmental protection is included. Please have following detailed information:

Dust <20 mg/Nm3

Cement silos:

- pinch valve for cement loading pipe
- over pressure protection
- over fill protection
- cement dust filter with 23 m2

The cement silos are connected totally to the control of the batching plant. The silo is equipped with a over pressure protection and an overfill protection as well as a dust filter with a surface of 23 m2. Also there is a pinch valve included in the inlet pipe which gets automatically closed in case of over pressure or reaching the maximum level so that an out blowing of cement into the air is not possible.

Additional to all these dust protection systems all outlets of the cement silo where dust can reach into the air a plastic pipe is connected which let the material flow to the ground where the material can be additional collected.

Weighing platform:

- cement weighing air filter
- aggregate waiting hopper closing
- housing of weighing platform

the dust areas of the weighing platform are protected by housing. Especially the cement weighing are protected with an additional filter to avoid dust.

Technisches Büro:
CH-9450 Altstätten, Trogenerstrasse 4
TEL: +41 71 757 72 00/FAX: +41 71 757 72 09
Homepage: www.xtecag.com **E-Mail: info@xtecag.com**

Mixing platform:

- mixer dust filter with ventilation
- housing of complete platform

The mixer has a dust filter with ventilation which gets automatically switched on by the control during loading the mixer.

Inclined belt conveyor:

- under belt cover
- upper belt cover

The belt is totally equipped with an under and with an upper cover on the belt conveyor.

Aggregate storage bins:

- complete housing

The aggregate storage is totally housed by panels so that the dust which can be made during loading is not able to go out of the bins.

NOISE PROTECTION:

Full housing of the complete plant with 60 mm insulation panels

operation:	noise emission in dB (A) based on a distance of						
	50 m	**100 m**	**150 m**	**200 m**	**250 m**	**300 m**	**350 m**
plant	48,0	42,0	38,5	38,0	36,0	34,5	33,0

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Homepage: www.xtecag.com **E-Mail: info@xtecag.com**

DEPARTMENT of ENVIRONMENTAL PROTECTION BUREAU
of NEW SOURCE REVIEW
CONTROL DATA SHEET
DUST COLLECTOR

MANUFACTURER: _____WAM USA INC _____

MODEL: _____FS.4.J.39_____

SPECIFY _____ BAGHOUSE
__X__ CARTRIDGE
_____ OTHER _____

NUMBER OF BAGS OR CARTRIDGES: ___28_____

SIZE OF BAG OR CARTRIDGE: _____6" X 30"_____

TOTAL BAG OR CARTRIDGE AREA (FT2) _____400_____

MAXIMUN CAPACITY (ACFM) _____2400_____

BAG OR CARTRIDGE FABIX _____POLYESTER_____

FABRIC WEIGHT (oz) _____8oz_____

WEAVE _____10 MICRON_____

FINISH _____COATED_____

MAXIMUM FABRIC TEMPERTURE _____165 DEGREES F _____

EFFICINCY (%) _____99.9%_____

AIR TO CLOTH RATIO _____6:1 _____

METHOD OF CLEANING: _____ REVERSE AIR
____X_ PULSE JET
_____ SHAKER

OPERATING PRESSURE DROP: MIN _.5____ MAX __8__ (INCHES OF WATER)

PARTICULATE GRAIN LOADING: INLET __30_ OUTLET _.01_

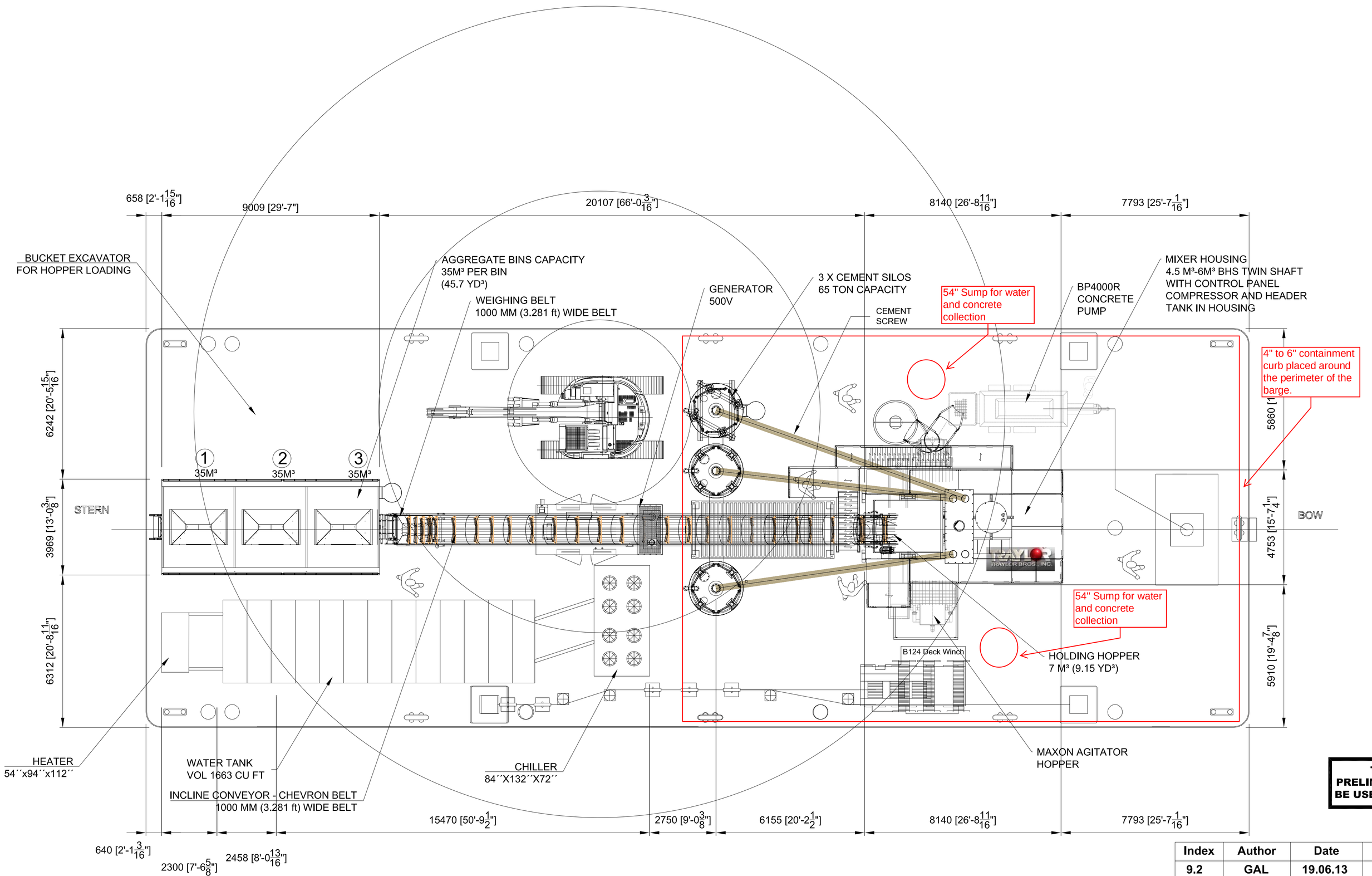
FAN REUIRMENTS HP _____
SCFM _____
VENTING _X___

APPENDIX B

Barge Drawings and Airflow Diagrams

- **Drawing GA100** **Batch Plant Plan view**
- **Drawing GA101** **Batch Plant Profile view**
- **Drawing GA102** **Airflow Diagram**
- **Drawing GA103** **Barge Layout in Production**
- **Drawing GA104** **Supply Barge Plan & Profile view**
- **Drawing GA105** **Aggregate Barge Plan view**
- **Drawing GA106** **Aggregate Barge Type**

BATCH PLANT PLAN VIEW



THIS DRAWING IS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION

PLAN
scale 1:100 @ A1

floor load:
ground floor: max. load capacity 2.0 kN/m² (200 kg/m²)
top floors: max. load capacity 1.5 kN/m² (150 kg/m²)

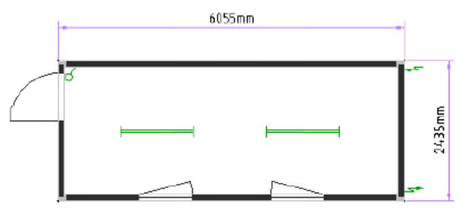
snow load: max. load capacity 1.0 kN/m² (100 kg/m²)
(equates to a typical snow load on the ground of s_k1.25 kN/m² (125 kg/m²) according to EN1991-1-3 with the national application document B1991-1-3)

wind load: 90 km/h [25 m/s] - terrain category III
When wind speeds are higher than 90 km/h (25m/s) additional safety measures on the cabins need to be carried out (anchoring, screwing). Such measurements are to be calculated by approved specialists taking into consideration local standards and conditions.

All calculations were undertaken accoding to the European standards of ENV.

Higher load capacity upon request

Office cabin 20'



PROPOSED CONTROL ROOM AND OFFICE CABINS

DETAILS OF ECM160-260 BARGE PLANT FOR TRAYLOR BROTHERS USA

Index	Author	Date	Description
9.2	GAL	19.06.13	Modified agg hopp and cement silos
10	GAL	21.06.13	Short agg hopp structure, long conv.
11.3	GAL	26.06.13	Moved the front structures to back for 6m, changed inclination for loading conveyor
12	GAL	27.06.13	Moved the front structures in front for 10 feet, reposition generator, silos and stairs
13	GAL	27.06.13	Common stair for office and mixer and adjusted the position for the extra silo
14	GAL	27.06.13	Added a more precise drawing of water tank and ciller, but in mirror position
15	GAL	25.07.2013	Moved silos in line

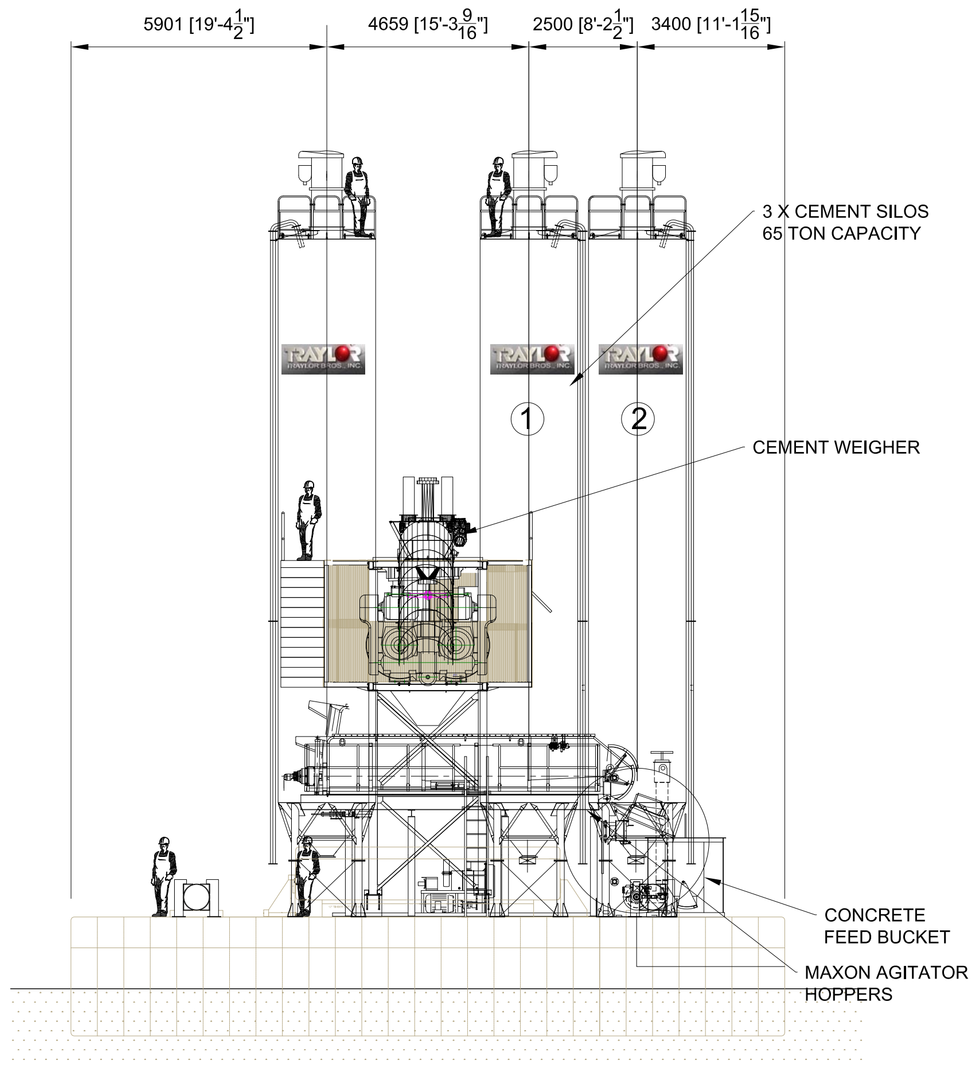
CONTRACT: ECM160-260 BP
Building : ECM150-260 BP
CLIENT: TRAYLOR BRO
Location : TBA

x-tec ag
Professional Solutions
Tel. : +41 71 757 7200
Fax : +41 71 757 7209
CH-9490 Altstaetten
Trogenerstrasse 4
www.xtecag.com

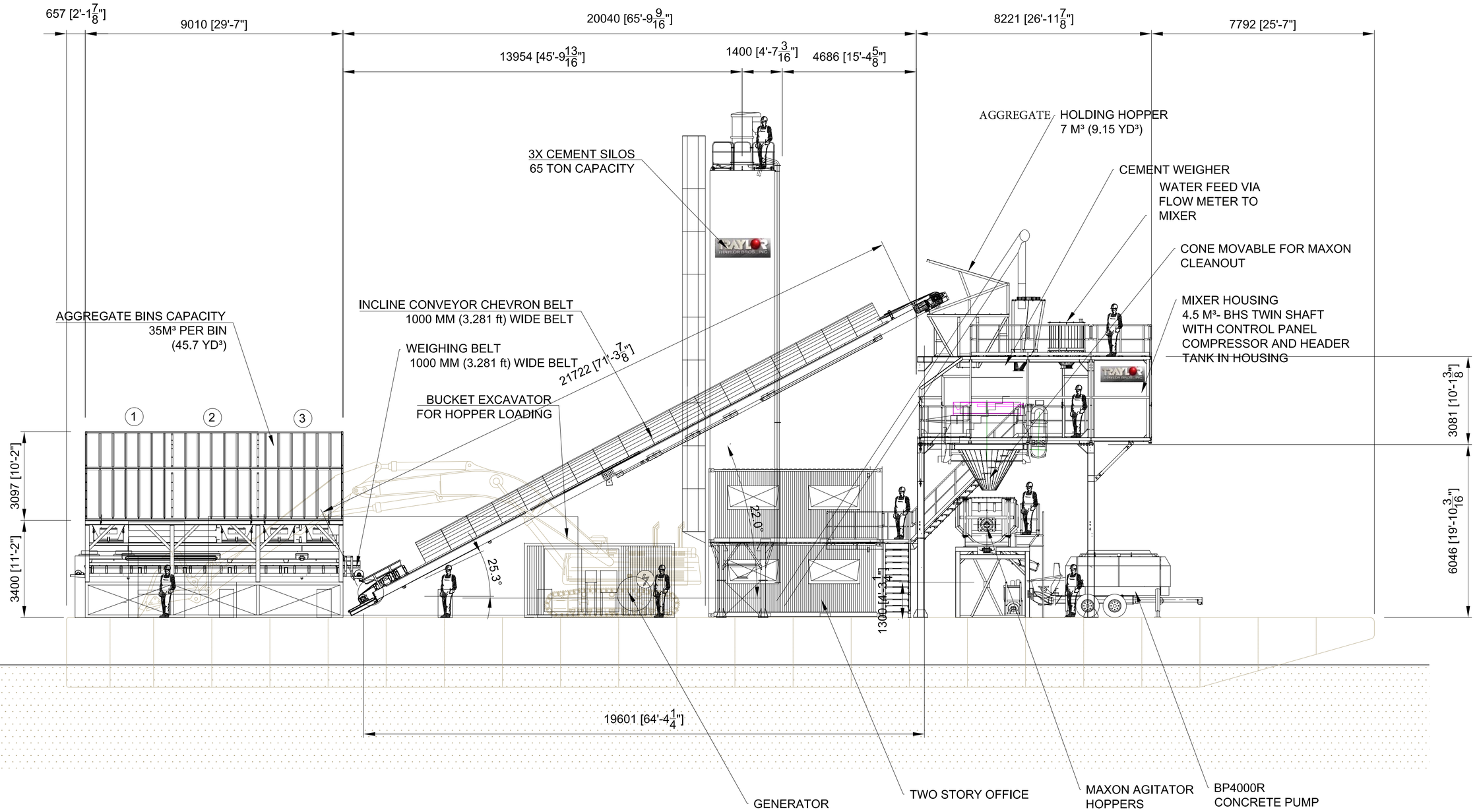
Project no. ECM160-260 BP
Phase: PHASE 1 PLANNING
Coating: GALVANISING

	Name:	Date:	
TB:			SCALE
Contractor:		30-04-13	1:100
Designer:	MK JWP		
Detailer:	JWP	30-04-13	Part Number
Check:			ECM100 BP
Model File:		Drawing Number :	GA100
Material:	S275	Revision	15

Plot Date:

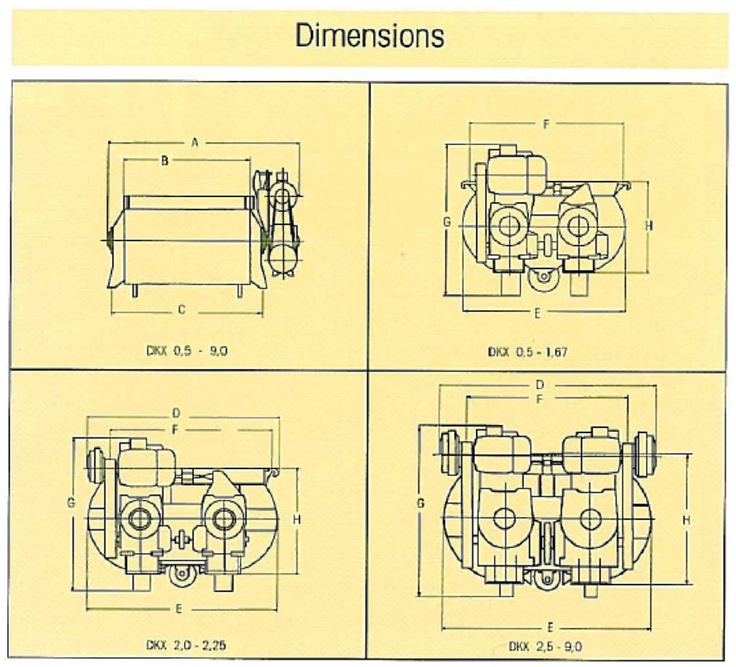


END ELEVATION
scale 1:100 @ A1

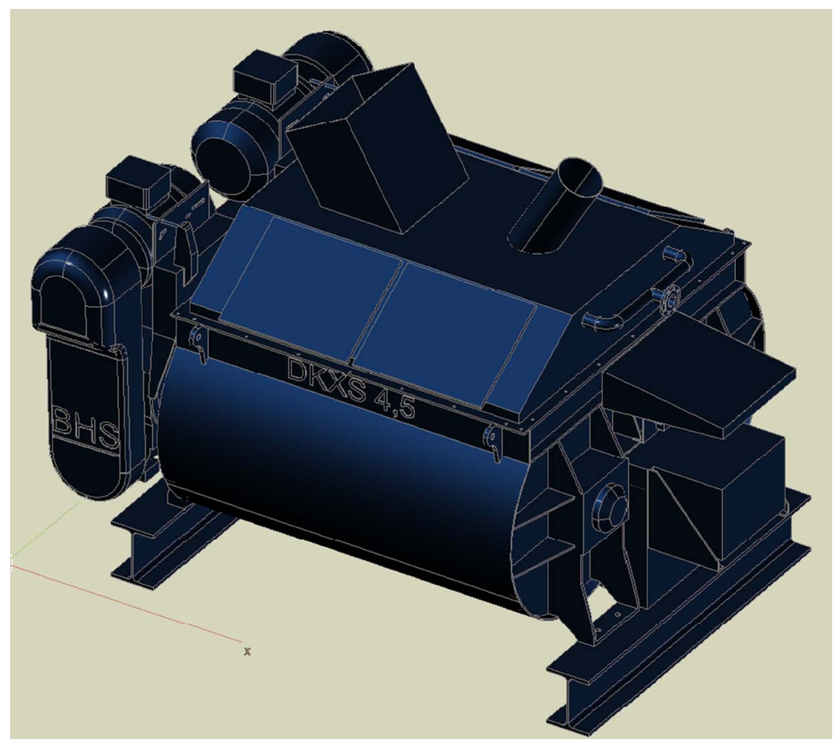


SIDE ELEVATION
scale 1:100 @ A1

BHS MIXER DATA SHEET



DKX	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	Weight kg
0,75	2435	1500	1840	–	1640	1570	1560	1000	3600
1,0	2590	1500	1840	–	2040	1820	1885	1200	4600
1,25	2590	1500	1840	–	2040	1820	1885	1200	4600
1,67	2920	1765	2105	–	2040	1820	1920	1200	5700
2,0	2600	1480	1900	2530	2470	2260	2040	1400	7250
2,25	2850	1740	2160	2530	2470	2260	2040	1400	8100
2,5	3100	1990	2410	2583	2470	2260	2070	1400	8700
2,75	3150	1990	2410	2663	2470	2260	2080	1400	9600
3,0	3410	2250	2670	2663	2470	2260	2080	1400	9800
3,5	3250	1994	2400	3010	2854	2550	2140	1650	12500
4,0	3500	2254	2660	3010	2854	2550	2140	1650	14000
4,5	3995	2145	2605	3350	3180	2840	2720	1950	19500
5,0	4260	2410	2870	3350	3180	2840	2720	1950	21000
6,0	4790	2940	3400	3350	3180	2840	2760	1950	24000
7,0	5290	3480	3936	3100	3180	2840	2590	1950	26000
8,0	4530	2430	3020	4070	4050	3540	3200	2400	35000
9,0	5060	2960	3550	4070	4050	3540	3200	2400	40000



DETAILS OF ECM160-260 BARGE PLANT FOR TRAYLOR BROTHERS USA

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CONTRACT: ECM160-260 BP
Building : ECM160-260 BP
CLIENT: TRAYLOR BRO
Location : TBA

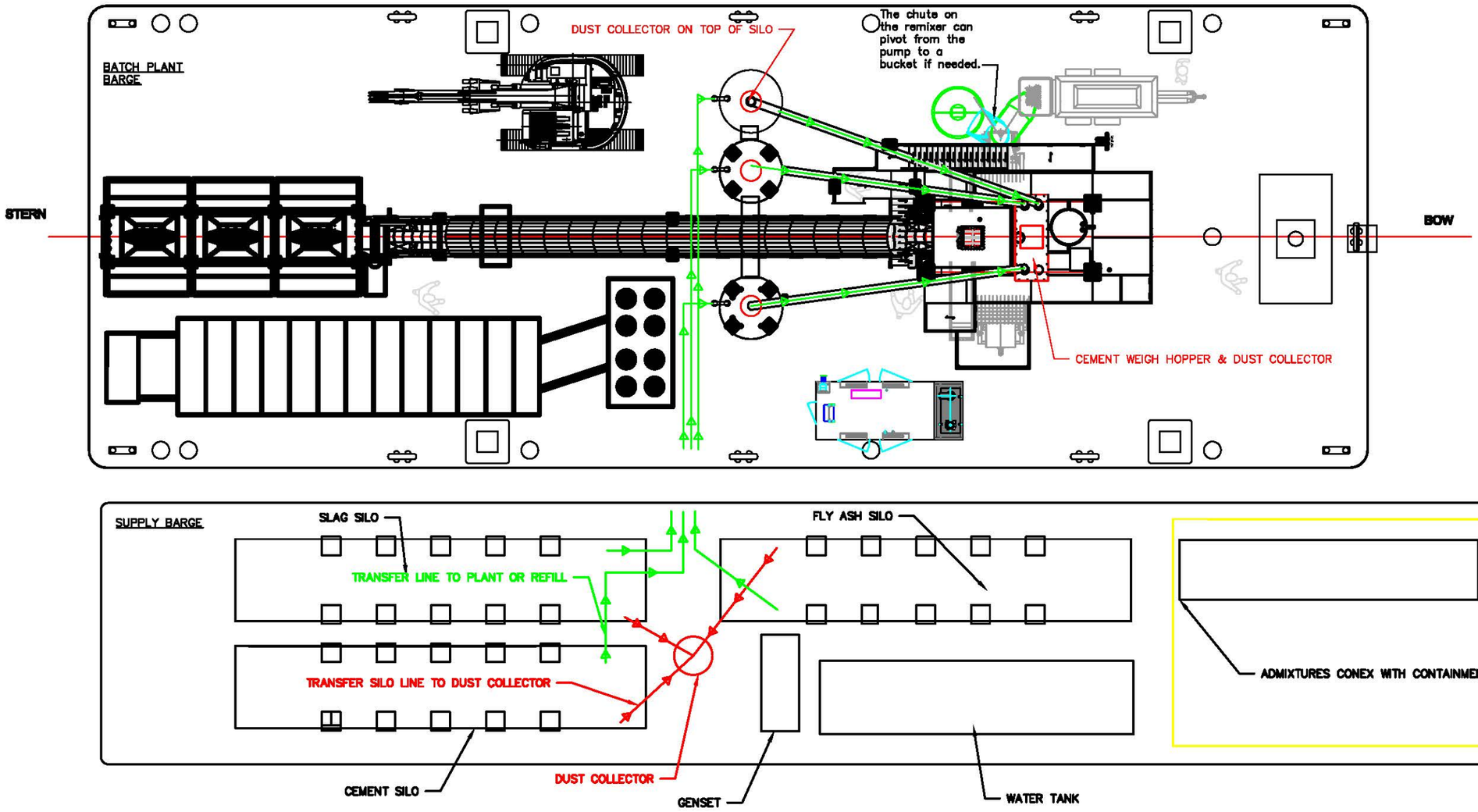
x-tec swiss ag
Professional Solutions
Tel. : +41 71 757 7200
Fax : +41 71 757 7209
CH-9490 Altstaetten
Trogenerstrasse 4
www.xtecag.com

Project no. ECM160-260 BP
Phase: PHASE 1 PLANNING
Coating: GALVANISING

	Name:	Date:	SCALE
TB:			1:100
Contractor:		30-04-13	
Designer:	MK JWP		Part Number
Detailer:	JWP	30-04-13	ECM160-260 BP
Check:			
Model File:		Drawing Number :	GA101
Material:	S275	Revision	15

Plot Date:

Air Flow Diagram



Legend:

The Green transfer line is the flow of material from the supply barge silo's to the plant plant barge silo's when unloading. Once material is in the plant barge silo's it will be conveyed to the plant through augers shown in yellow.

The Green transfer line on the supply barge double as the fill lines when taken to land.

The Red line are the vent lines used to vent air pressure when loading or unloading to capture the dust in the vented air.

Items labeled dust collector in RED are points where vented pressure will capture dust from the either end of this closed system.

Drawn	Checked	Approved	Date
WED	CHKDBY	APPDBY	11/15/2013
Scale	Drawing Number		Revision
NTS	GA102		

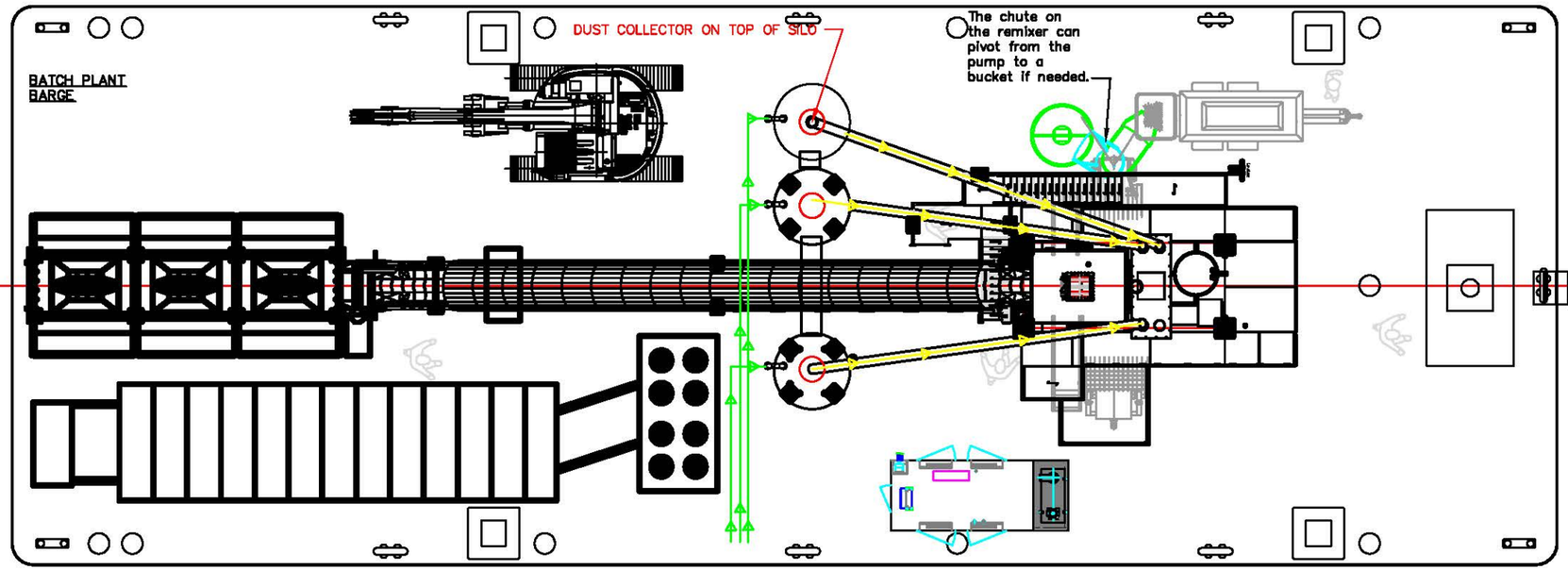
Barge Layout in Production.

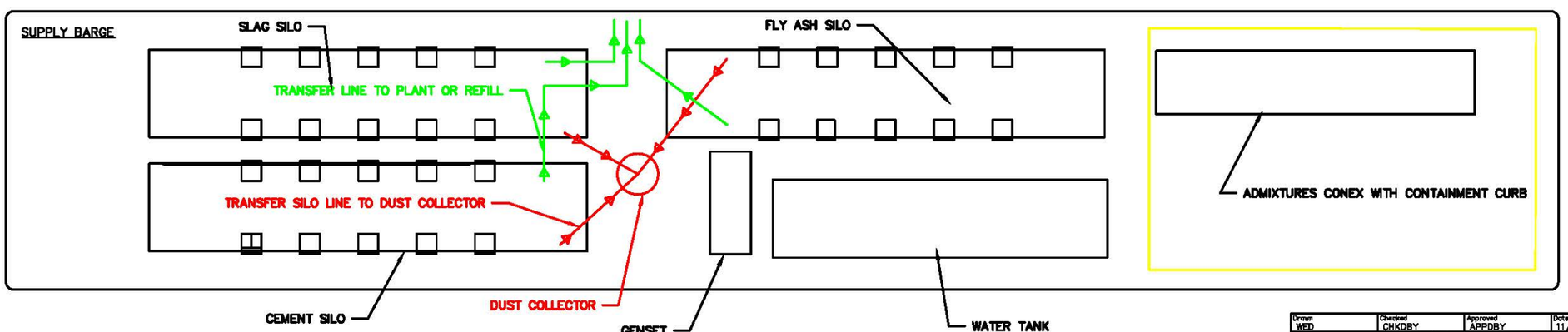
AGGREGATE BARGE

ROCK

3–5' CONTAINMENT CURB

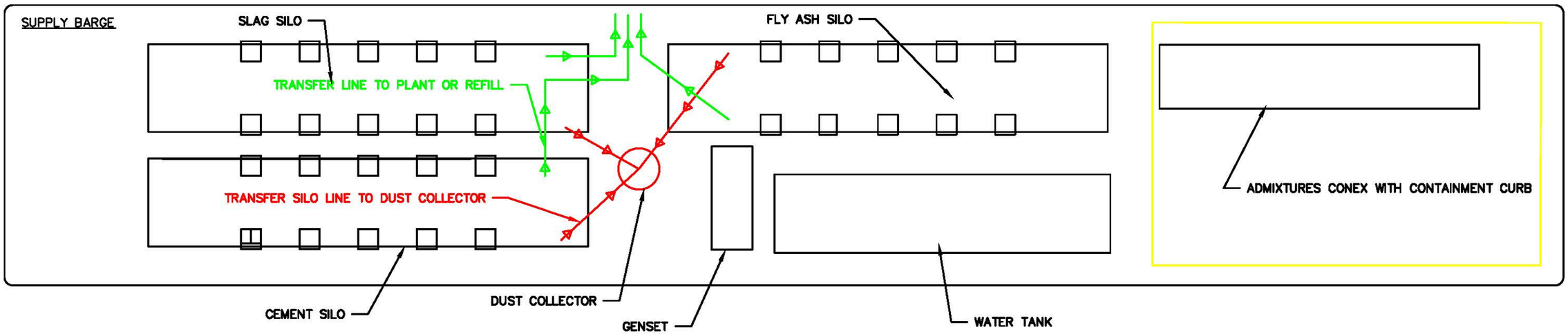
SAND

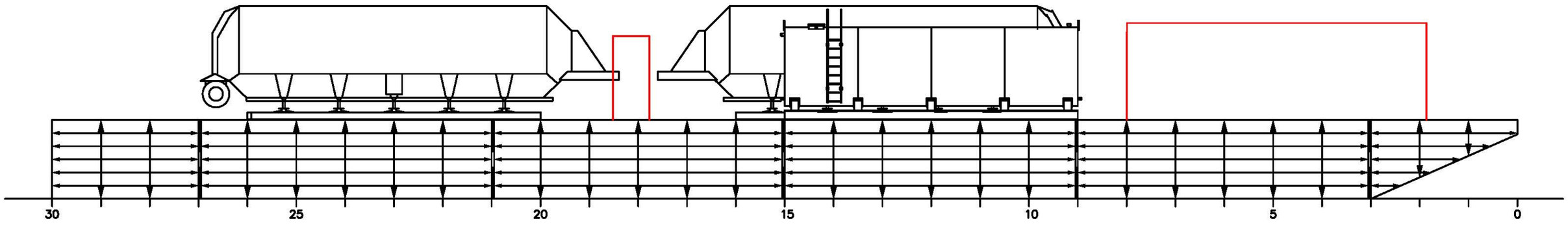




Drawn	Checked	Approved	Date
WED	CHKDBY	APPDBY	11/15/2013
Scale	Drawing Number		Revision
NTS	GA103		

Supply Barge Plan and Profile View

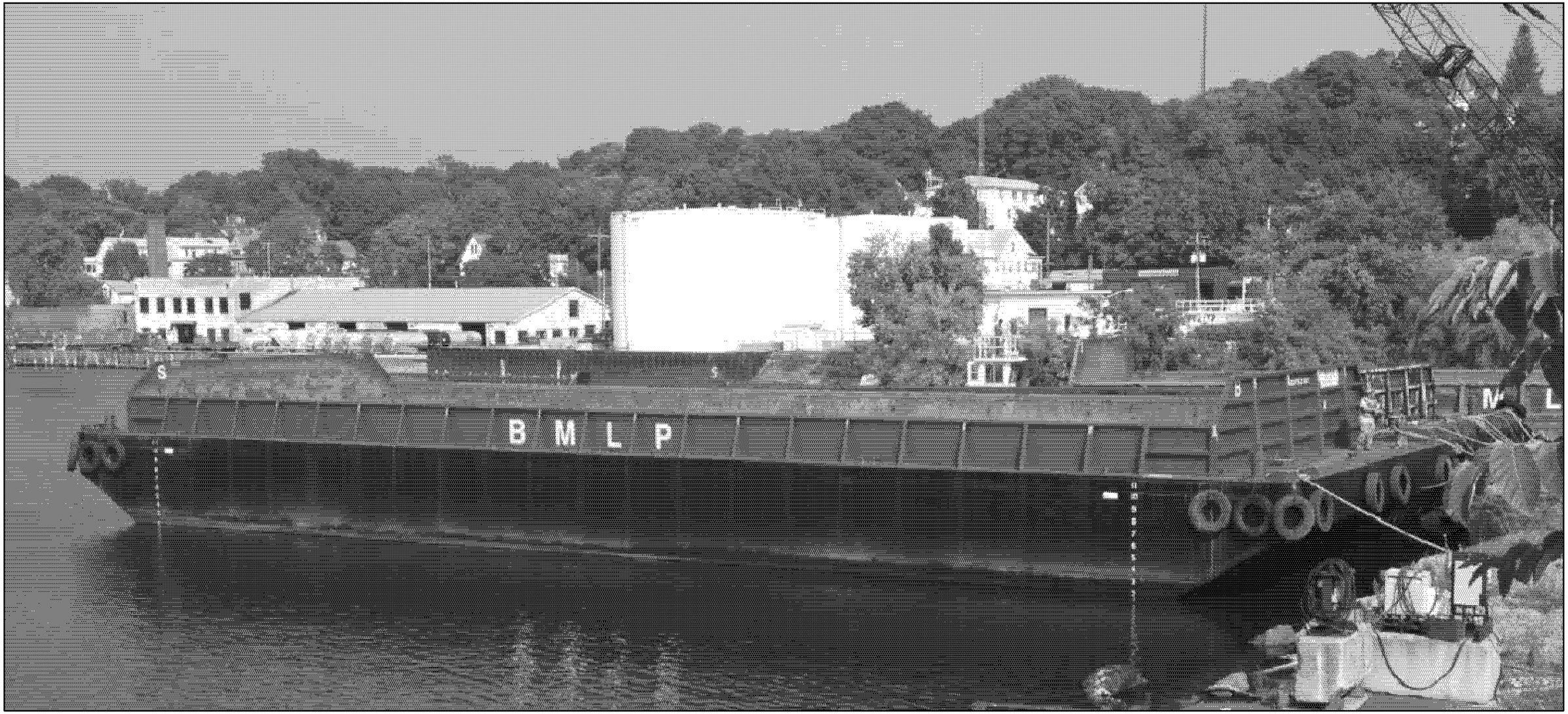




Drawn	Checked	Approved	Date
WED	CHKDBY	APPDBY	11/15/2013
Scale	Drawing Number		Revision
NTS	GA104		

AGGREGATE BARGE PLAN VIEW

Drawn	Checked	Approved	Date
WED	CHKDBY	APPDBY	11/15/2013
Scale	Drawing Number		Revision
NTS	GA105		



AGGREGATE BARGE

Drawn	Checked	Approved	Date
WED	CHKDBY	APPDBY	11/15/2013
Scale	Drawing Number		Revision
NTS	GA106		

APPENDIX C

Material Transfer Hose Information

GOODYEAR ENGINEERED PRODUCTS

VEYANCE TECHNOLOGIES

Black Softwall

APPLICATION:

For the discharge of dry bulk cement from tank truck and in-plant service.

Get the added benefit of SURVIVOR LEARN MORE

CONSTRUCTION

TUBE: 1/8" (static dissipating/static conductive) Black Tufsyn® synthetic rubber. Available in 1/8", 3/16", and 1/4" tube gauges.

COVER: Black Plioflex® synthetic rubber with white spiral stripe (wrapped impression)

REINFORCEMENT: Spiral-plied synthetic fabric

TEMPERATURE: -25°F to 180°F (-32°C to 82°C)

PACKAGING: 100' lengths, coiled and polywrapped

BRANDING (SPIRAL): Example: Goodyear® Black Softwall

COUPLINGS: Contact fitting manufacturer for proper fitting recommendation and coupling procedure. Use Goodyear Engineered Products Insta-Lock™ Cam & Groove Fittings with this product. See the "Couplings Systems" section of this website for available Insta-Lock products.

NON-STOCK/SIZES: For special production run minimum requirements, contact customer service.

ORDER CODES: 549-152 (1/8" tube gauge 50psi) / 549-149 (3/16" tube gauge) / 549-148 (1/4" tube gauge) / 549-795 *(with Survivor Compound: 4X100 - 1/4)* / 549-790 *(with Survivor Compound: 4X100 - 1/8)* / 549-804 *(with Survivor Compound: 4X 00 - 3/16)*

Find Distributor | Resource Center | OIL&GAS Learn More

ID		NOM. OD		MAX. WP		WEIGHT	
in.	mm.	in.	mm.	psi.	Mpa.	lb./ft.	kg./m.
4	101.6	4.42	112.27	50	0.34	1.38	2.05
5	127.0	5.44	138.18	50	0.34	1.82	2.71
6	152.4	6.45	163.83	50	0.34	2.25	3.35

Insta-lock™ Coupling System

The innovative Insta-Lock™ cam and groove coupling system is the culmination of years of laboratory research and in-the-field experience. The result is an amazingly durable, reliable and secure coupling system suitable for numerous industrial hose applications. Insta-Lock™ has 10 unique features that make it the preferred coupling system for operators looking for greater convenience, security and productivity.

Insta-lock™ Type A
Type A fitting is commonly threaded onto a pipe, threaded hose end or manifold system, which is connected and disconnected on a regular basis.

Insta-lock™ Type B
Type B fitting is normally threaded onto a pipe or manifold which joins to a rubber hose assembly which is connected and disconnected regularly.

Insta-lock™ Type C
Type C fitting can be attached to a rubber hose with the use of interlocking ferrules, crimp sleeves, or bands.

Insta-lock™ Type D
Type D fitting is commonly threaded onto a pipe, threaded hose end, or manifold system, which is connected and disconnected on a regular basis.

Insta-lock™ Type E
Type E fitting can be attached to a rubber hose with the use of interlocing ferrules, crimp sleeve and bands.

Insta-lock™ Type F
Type F fitting is normally threaded into pipe or manifold connections and mated with Part C, Part B, or Part D.

Insta-lock™ Interlocking Stainless Steel Male NPT Hose Stem
Our Interlocking Stainless Steel Male NPT Hose Stem fitting are designed to be attached to a rubber hose with the use of a Insta-Lock Ferrule.

Insta-lock™ Dust Cap
Dust Cap is used to seal the pipe system and hose assemblies during nonuse or transfer of assembly.

Insta-lock™ Dust Plug
Dust plug is used to seal the pipe system and hose assemblies during nonuse or transfer of assembly.

Insta-lock™ Interlocking Ferrule
304# Stainless Steel.

Insta-lock™ Repair Kits
316# Stainless Steel and Brass.

APPENDIX D

Concrete Placement Pneumatic Valve (Air Cuff)

And

Concrete Bucket

Information

View Our Catalog

Accessories Menu

- Gaskets
- Couplings
- Coupling Repair Parts
- Cleanout
- Air Cuff™
- Hose Accessories
- Weld Ends
- Adapters

Boom Systems

- Boom Pipe
- Deck Pipe
- Elbows
- Reducers
- Backend Kits
- Accessories
- Hose

Lay-Down Systems

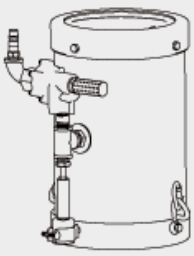
- Pipes
- Bends
- Valves
- Brackets
- Accessories
- Small Line

Placing Equipment

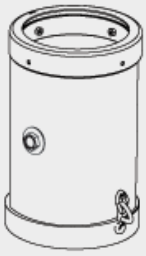
- Krete Placers
- Bridge Deck Spreaders
- Tunnel Placers

AIR CUFF™

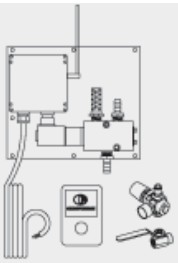
Manual or Remote-Operated Valve. Controls the Flow of Concrete



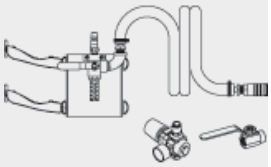
AIR CUFF™ VALVE ASSEMBLY



AIR CUFF™ REPLACEMENT CUFF



REMOTE KIT



MANUAL KIT

KEY PRODUCT SPECIFICATIONS AT A GLANCE

- **Length:** 15"
- **Diameter:** 9.5"
- **Weight:** 21 lbs
- **Max. Air Pressure:** 90 PSI
- **Cycle Time:** 4 seconds

KEY PRODUCT CHARACTERISTICS

- Cycle time of 4 seconds, eliminates spill and waste
- Fits all 3" through 5" diameter discharge hose
- Eliminates the need to kink and wire hose at the tip
- Operates from truck's air supply
- Can be operated by hand held remote control or integrated into pumps control box. Consult factory for details.
- Includes Air Cuff™, remote and fittings for complete installation
- Safe alternative to the double 90°

AIR CUFF™ SHUT-OFF VALVE

Product Description	Part No.
Manual Air Cuff™ Kit	V50ASC-MAN
Remote Control Kits	
Universal Kits	
12-Volt Air Cuff™ Kit	V50ASC-12R
24-Volt Air Cuff™ Kit	V50ASC-24R
Replacement Cuff	V50ASC-ACA

UP

- Accessories

Hose

- **NEW**
- Boom
- Discharge
- Reducing
- Accessories

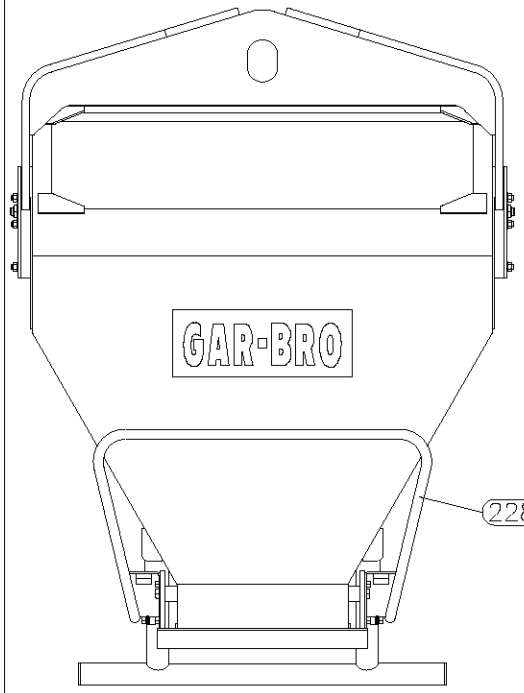
DESCRIPTION	446–L	466–L	496–L	4126–L	4156–L
LIFTING BAIL	3237	3238	3239	3240	3241
BAIL PIVOT BOLT	3250	3250	2678	2678	2678
BAIL PIVOT BOLT NUT	1761	1761	3065	3065	3065
BAIL PIVOT BUSHING	3246	3246	3247	3248	3249
BAIL PIVOT BOLT WASHER OUTER	0203	0203	0274	0274	0274
BAIL PIVOT BOLT WASHER INNER	0203	0203	1220	1220	1220
BAIL SAFETY BOLT	2704	2704	2703	1626	1626
BAIL BOLT NUT	2245	2245	2245	1181	1181
BAIL BOLT WASHER	2404	2404	2404	2185	2185

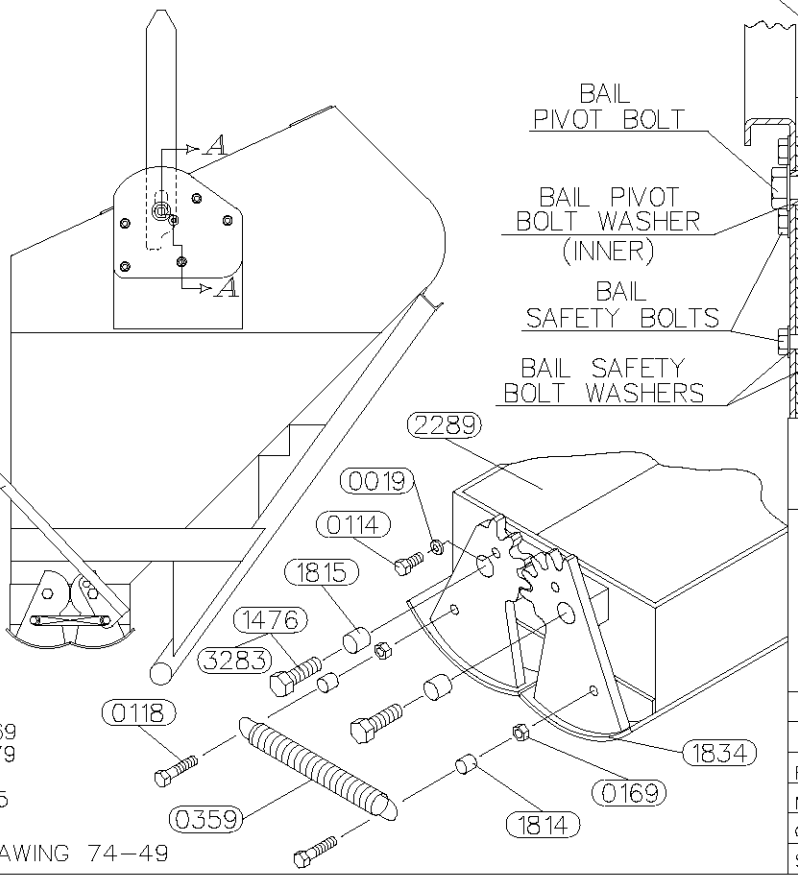
WHEN ORDERING PARTS, SPECIFY:

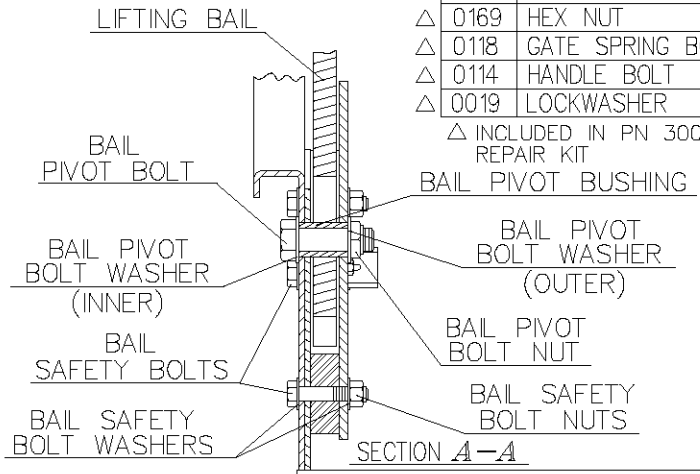
1. THIS DRAWING NO: 01–55
2. PART NUMBER
3. QUANTITY
4. DESCRIPTION

	PART #	DESCRIPTION
△	3283	THREAD LOCKING CMPD
	3000	"G" GATE REPAIR KIT
	2289	"G" GATE COMPLETE
	2288	GATE LEVER
△	1834	GATE PLATE/ R ARM ASSY
△	1815	PIVOT BUSHING
△	1814	SPRING SPACER
△	1476	PIVOT BOLT
△	0359	GATE SPRING
△	0169	HEX NUT
△	0118	GATE SPRING BOLT
△	0114	HANDLE BOLT
△	0019	LOCKWASHER

△ INCLUDED IN PN 3000 REPAIR KIT







FOR BUCKETS MANUFACTURED AS FOLLOWS:
ITEM 446–L BUILT AFTER NOVEMBER 1998 S.O. 10569
ITEM 466–L BUILT AFTER SEPTEMBER 1992 S.O. 6579
ITEM 496–L BUILT AFTER OCTOBER 1991 S.O. 6071
ITEM 4126–L BUILT AFTER FEBRUARY 1993 S.O. 6815
ITEM 4156–L BUILT AFTER MAY 1996 S.O. 8779
FOR ALL OTHER "L" SERIES BUCKETS, SEE DRAWING 74–49

GAR–BRO MANUFACTURING CO.
104 BOLTON SULLIVAN DRIVE P.O DRAWER 1077
HEBER SPRINGS, ARKANSAS – 72543–1077

ITEM 446–L THRU. 4156–L "L" SERIES LIGHTWEIGHT LAYDOWN BUCKET WITH NEW STYLE BAIL PARTS LIST

SCALE	NONE	SHOP NO.	SALES
DATE	7–9–01	SHIPPING CUBICS	
REVISED	9–1–11	DRAWING NO.	01–55
MADE BY	JPA		
CHANGED TO/FROM			
SUPERSEDES		SHEET	A OF A

EQUIPMENT
GAR-BRO
ENGINEERING SERVICE

Round Concrete Buckets

General Purpose Concrete Buckets

Gar-Bro General Purpose or 'G' Series Concrete Buckets are built for modern concrete requirements and general concrete work. Sturdy design and construction provides long life expectancy. All 'G' Series buckets feature the Gar-Bro Double Clamshell Gate with vertical center discharge. Standard gate size is 15 inches x 22 inches. Additional details and parts information available at WWW.GARBRO.COM/G-SERIES.HTM

Item No.	Rated Capacity Cubic Yards	Level Capacity Cubic Feet	Outside Diameter Inches	Loading Height Inches	Weight Pounds
411-G	1/3	10	39	35	355
413-G	1/2	15	45	38	420
423-G	3/4	24	51	46	565
433-G	1	30	57	51	615
442-G	1 1/2	42	64	55	795
462-G	2	58	72	58	1,045
493-G	3	87	76	72	1,445
4123-G	4	112	77	85	1,825

Bar-type lifting bail (411G to 413G)

Plate-type lifting bail (423G to 4123G)

Steep cone side slopes for efficient cleanout

Sturdy design and construction for long life expectancy

Variety of attachments available: Rubber accordion hoppers, steel sub-hoppers, air or hydraulic gate operation, side chutes

Low Loading heights

Bail-type operating handle (rope-pull) control possible)

Double Clamshell Gate

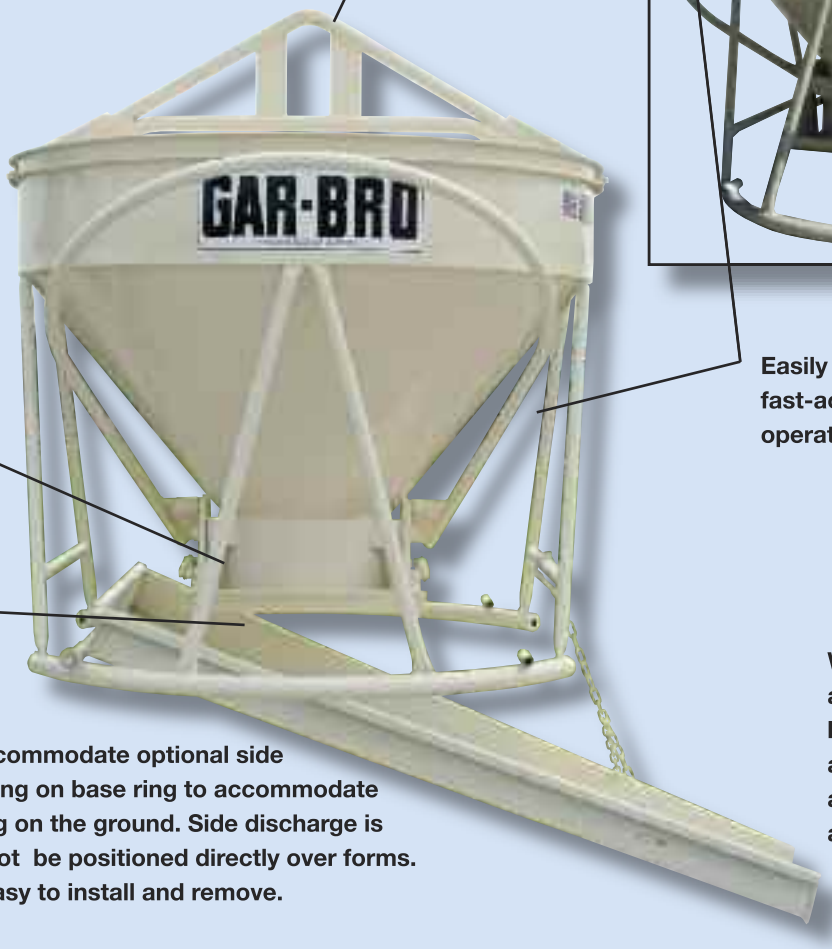
15" X 22" gate standard on 413G and larger - optional 22" x 32" gate available on 442G, 462G, 493G and 4123G

Lightweight Round-Gate Concrete Buckets

The Gar-Bro Round Gate or 'R' Series Concrete Bucket is 30% to 50% lighter than most standard steel buckets of the same capacity. The double clamshell 16-inch diameter gate features the Gar-Bro venturi throat and is non-jamming, grout tight and self-closing. A variety of attachments are available for all 'R' series buckets, including rubber accordion hoppers, side chutes, air operated gate systems, and extension collars. Additional details and parts information available at WWW.GARBRO.COM/R-SERIES.HTM

Item No.	Rated Capacity Cubic Yards	Level Capacity Cubic Feet	Outside Diameter Inches	Loading Height Inches	Weight Pounds
410-R	1/3	10	38	34	237
413-R	1/2	13.5	38	41	257
420-R	3/4	20.3	47	44	330
427-R	1	27.5	56	46	400
440-R	11/2	40.5	63	53	500
454-R	2	55	70	59	675
483-R	3	83	70	72	760

Exclusive one-piece lifting bail design reduces obstructions in bucket top opening area, making charging operation easier and faster



30% to 40% lighter weight than standard buckets of same rated capacity

Easily controlled by fast-acting bail-type operating handle

Venturi Throat for rapid discharge and thorough clean-out

Non-jamming, grout-tight, self-closing 16" diameter double-clamshell gates

Wide variety of attachments available: Rubber accordion hoppers, steel subhoppers, automatic gate powering and underwater placing attachments.

Bucket frame is made to accommodate optional side discharge chute. Note opening on base ring to accommodate chute when bucket is resting on the ground. Side discharge is essential when bucket cannot be positioned directly over forms. The optional side chute is easy to install and remove.

Rubber Accordion Hoppers

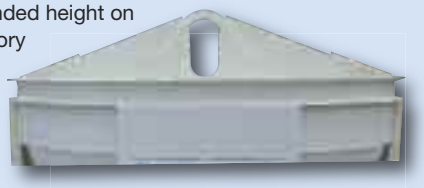
These hoppers confine concrete when pouring into narrow forms and minimizes segregation due to free-fall. Attached to the bucket gate, the hopper opens and closes with the gate itself to control spillage and ensure proper flow control. When grounded, it folds under the bucket without damage. Sizes to fit all Gar-Bro buckets. See our website at WWW.GARBRO.COM for more details.

Optional 90 Degree Gate Lever

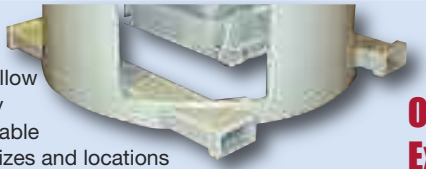
Optional modification to rotate the bucket gate lever (handle) 90 degrees to standard and allow gate operation with the gate lever directly over a wall or form. Also allows gate operation over or opposite to the optional bucket mounted side chute. Available at extra cost on all "R" and "G" series buckets. Call the factory for more details.

Optional Low Profile "Precast" Lifting Bail

Optional low profile bail, installed at extra cost and in lieu of standard lifting bail on "G" series buckets ¾ cubic yard and larger, allows direct connection of crane hook to bucket for hoisting without use of any intermediate lifting devices (such as an anchor shackle). Low profile design further reduces bucket suspended height on the crane. Call the factory for more details.

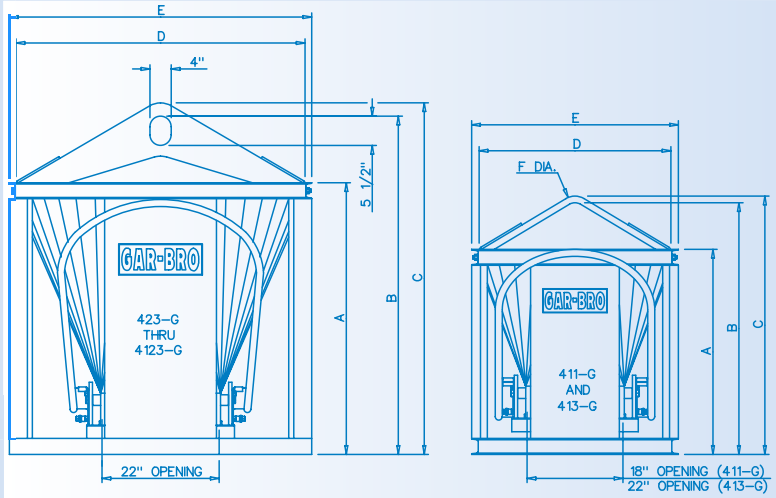


Optional Fork Pockets



Optional fork pockets installed on almost any GAR-BRO bucket will allow use of a forklift to safely move the bucket. Available at extra cost in many sizes and locations to suit almost any application. Call the factory for more details.

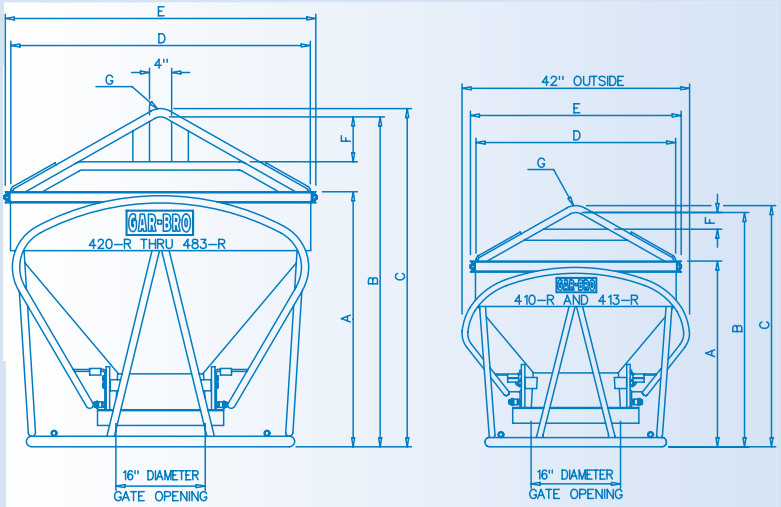
"G" Series Specifications



Item No.	Rated Capacity Cu.Yd	Gate Opening inches	Loading Height A (in)	Suspended Height B (in)	Overall Height C (in)	Inside Diameter D (in)	Outside Diameter E (in)	Round Bar Dia. F (in)	Empty Weight (lbs)
411–G	1/3	15 x 18	35	44	46	36	39	1 1/4	355
413–G	1/2	15 x 22	38	48	51	42	45	1 1/2	420
423–G	3/4	15 x 22	46	57	60	48	51	—	565
433–G	1	15 x 22	51	64	67	54	57	—	615
442–G	1 1/2	15 x 22*	55	69	72	60	64	—	795
462–G	2	15 x 22*	58	73	78	68	72	—	1045
493–G	3	15 x 22*	72	88	91	68	76	—	1445
4123–G	4	15 x 22*	85	98	101	68	77	—	1825

* OPTIONAL 22" x 32" GATE AVAILABLE

Round Specifications



Item No.	Rated Capacity Cu.Yd	Loading Height A (in)	Suspended Height B (in)	Overall Height C (in)	Inside Diameter D (in)	Outside Diameter E (in)	Between Rnd Bar F (in)	Round Bar Dia. G (in)	Empty Weight (lbs)
410–R	1/3	34	42	43 1/4	36	38	3	1 1/4	237
413–R	1/2	41	50	51 1/4	36	38	3	1 1/4	257
420–R	3/4	45	55	56 1/4	45	47	4 1/2	1 1/4	330
427–R	1.0	46	60	61 1/2	54	56	8	1 1/2	400
440–R	1 1/2	53	68	69 1/2	60	63	8 1/2	1 1/2	500
454–R	2	59	73	75	66	70	7 1/2	2.0	675
483–R	3	72	87	89	66	70	9 1/2	2.0	760

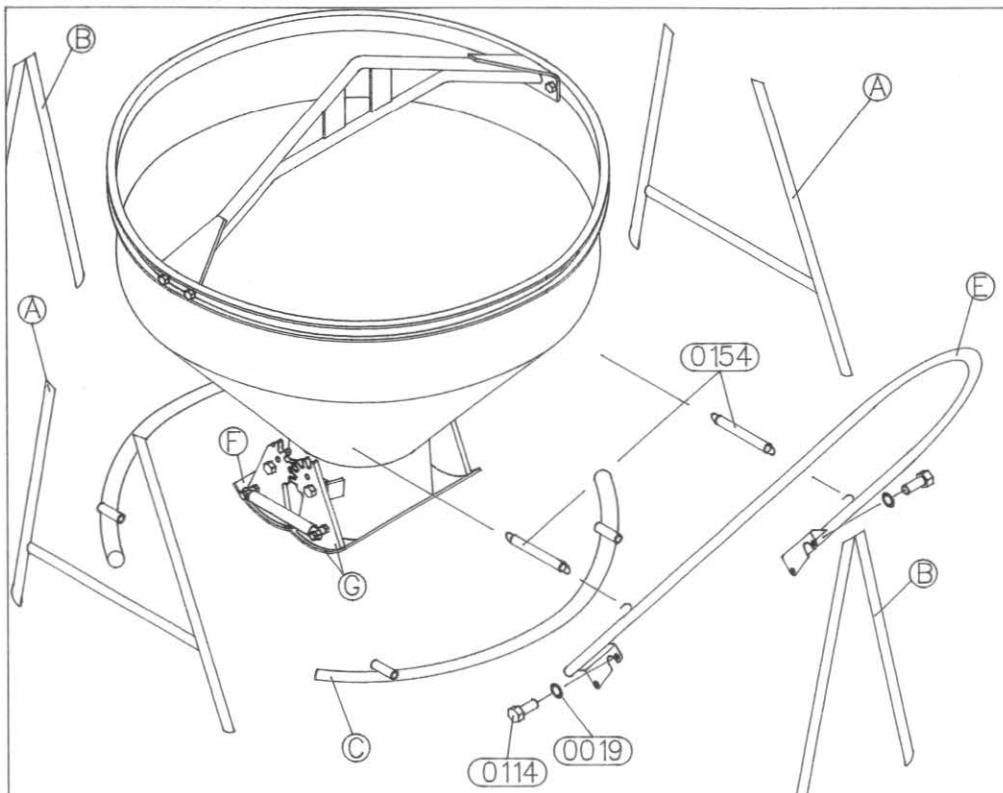
Optional Extension Collars

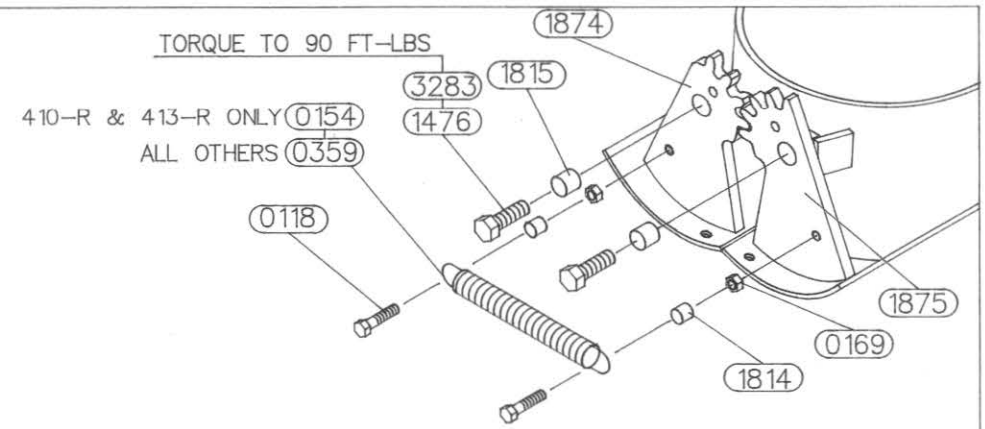
Available in 1/4 and 1/2 cubic yard sizes. Call the factory for more details.

Gar-Bro Manufacturing Company

P.O. Drawer 1077 • 104 Bolton Sullivan Drive • Heber Springs, Arkansas 72543-1077
Phone: (501) 362-8171 • Internet Address: http//www.garbro.com • E-Mail: GARBROCO@GARBRO.COM
Orders Toll Free Number: (800) 643-8192 • 24 HR Toll Free Fax: (888) 643-8192 • Fax: (501) 362-7123

MAY 2010 MOD





	PART NO.	DESCRIPTION
△	0019	LOCKWASHER
△	0114	GATE LEVER BOLT
△	0118	GATE SPRING BOLT
⊕	0154	GATE LEVER SPRING
△	0169	HEX NUT
△	0359	GATE SPRING
△	1476	PIVOT BOLT

⊕ 440-R,454-R, & 483-R

	PART NO.	DESCRIPTION
△	1814	SPRING SPACER
△	1815	PIVOT BUSHING
	1874	RADIUS ARM, 4 TEETH
	1875	RADIUS ARM, 5 TEETH
	2620	R GATE COMPLETE
	3002	R GATE REPAIR KIT
△	3283	THREAD LOCKING CMPD

△ INCLUDED IN PN 3002 REPAIR KIT

REF	DESCRIPTION	ITEM NUMBER						
		410-R	413-R	420-R	427-R	440-R	454-R	483-R
A	"A" LEG ASSEMBLY	2884	2885	2886	2887	2888	2889	2890
B	"V" LEG ASSEMBLY	2891	2892	2893	2894	2895	2896	2897
C	RING SECTOR, PIPE	2898	2899	2900	2901	2902	2903	2904
D	COMPLETE FRAME	2877	2878	2879	2880	2881	2882	2883
E	GATE LEVER	2905	2906	2907	2908	2909	2910	2911
F	GATE PLATE ONLY	2332	2332	2332	2332	2332	2332	2332
G	GATE PLATE ASSEMBLY	2505	2505	2505	2505	2505	2505	2505 △

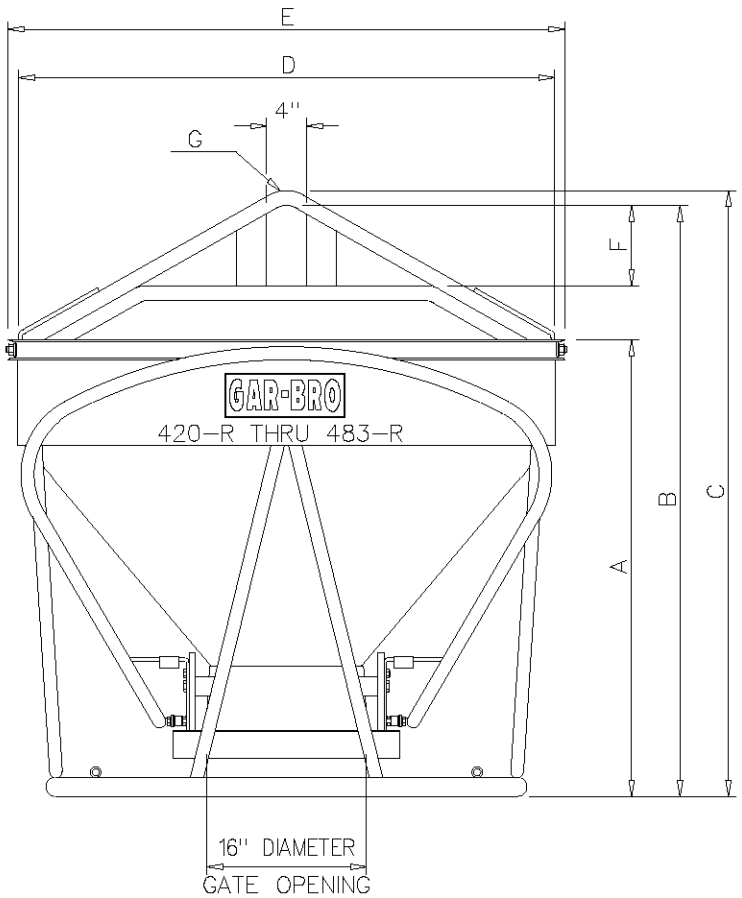
NOTE: RADIUS ARMS AND GATE PLATES MAY BE ORDERED SEPARATELY USING CORRESPONDING PART NUMBERS AS SHOWN – HOWEVER – FOR EASE OF ASSEMBLY AND PROPER GATE ALIGNMENT IT IS RECOMMENDED THAT THE "GATE PLATE ASSEMBLY" –REF "G"– BE ORDERED
THE "GATE PLATE ASSEMBLY" IS FURNISHED COMPLETE WITH RADIUS ARMS ATTACHED AT EACH END – TWO GATE PLATE ASSEMBLIES ARE REQUIRED PER GATE

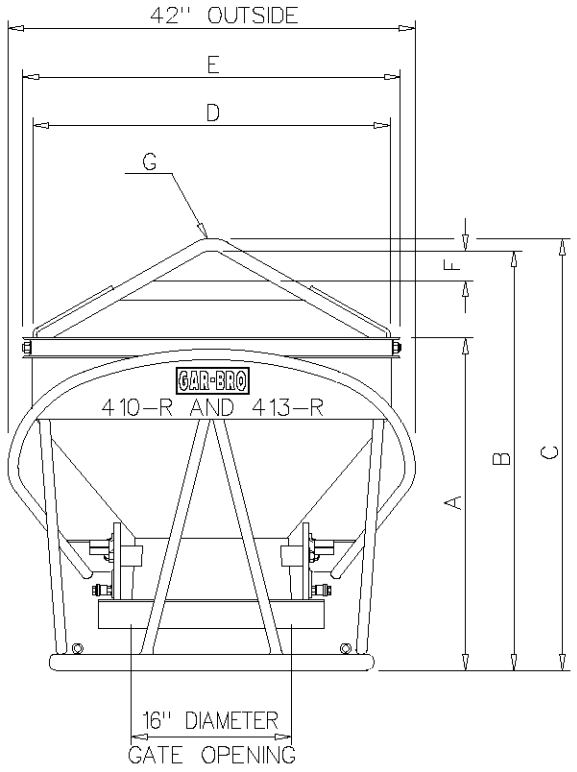
WHEN ORDERING PARTS, SPECIFY:
1. THIS DRAWING NO: 77-46
2. PART NUMBER
3. QUANTITY
4. DESCRIPTION

GAR-BRO MANUFACTURING CO.
HIGHWAY 110 EAST P.O DRAWER 1077
HEBER SPRINGS, ARKANSAS – 72543-1077

PARTS LIST
"R" SERIES
LIGHTWEIGHT ROUND-GATE BUCKETS
STANDARD 16" DIAMETER GATE

SCALE	NONE	SHOP NO.	PARTS
DATE	10-24-95	SHIPPING CUBICS	
REVISED	6-25-02	DRAWING NO.	77-46
MADE BY	DCG		
CHANGED TO/FROM			
SUPERSEDES		SHEET	A OF A





Item No.	Rated Capacity Cu.Yd	Loading Height A (in)	Suspended Height B (in)	Overall Height C (in)	Inside Diameter D (in)	Outside Diameter E (in)	Between Rnd Bar F (in)	Round Bar Dia. G (in)	Empty Weight (lbs)
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413–R	1/2	41	50	51 1/4	36	38	3	1 1/4	257
420–R	3/4	45	55	56 1/4	45	47	4 1/2	1 1/4	330
427–R	1	46	60	61 1/2	54	56	8	1 1/2	400
440–R	1 1/2	53	68	69 1/2	60	63	8 1/2	1 1/2	500
454–R	2	59	73	75	66	70	7 1/2	2.0	675
483–R	3	72	87	89	66	70	9 1/2	2.0	760

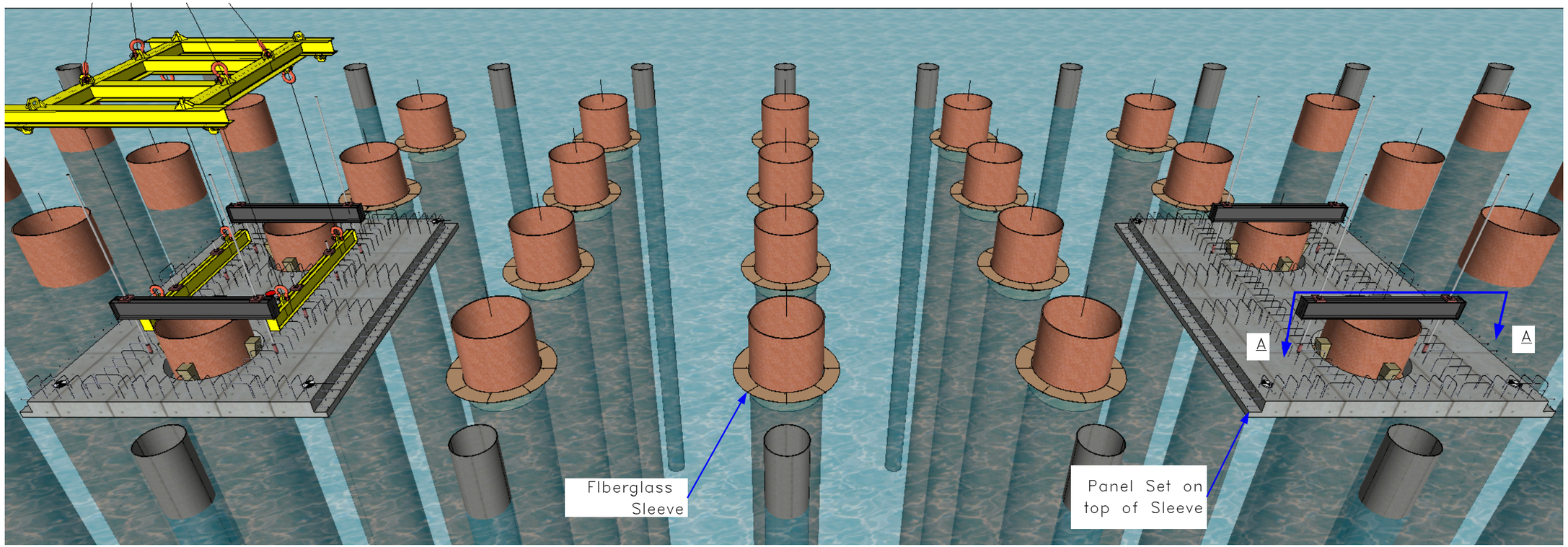
GAR–BRO MANUFACTURING CO.
104 BOLTON SULLIVAN DRIVE P.O DRAWER 1077
HEBER SPRINGS, ARKANSAS – 72543–1077

"R" SERIES – ROUND GATE LIGHTWEIGHT BUCKET SPECIFICATIONS

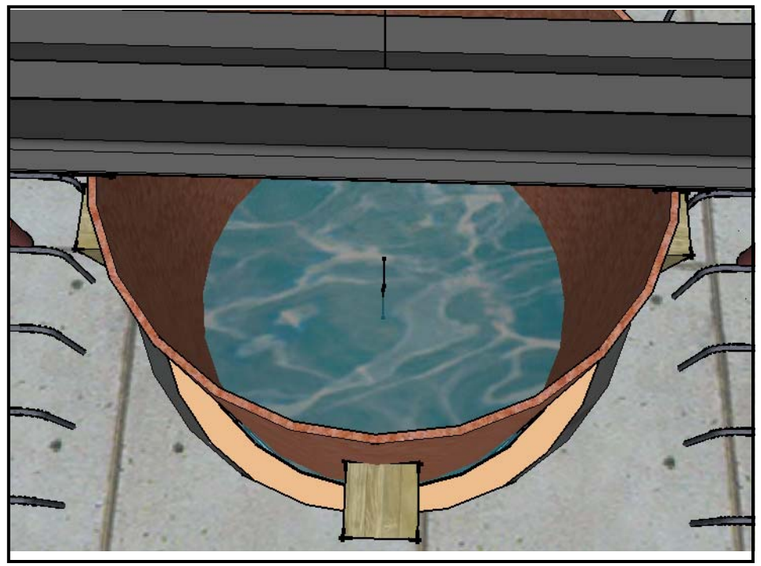
SCALE NONE	SHOP NO. SALES
DATE 12–04–00	SHIPPING CUBICS
REVISED 3–10–08	DRAWING NO. 00–73
MADE BY BLC	
CHANGED TO/FROM	
SUPERSEDES 85–13	SHEET A OF A

APPENDIX E

Pipe Pile Seals



Footing Precast Panel Annualr Seal around Piles



Section A–A

REVISIONS

	REMARKS	MM/DD/YY
1		
2		
3		
4		
5		

PRELIMINARY DRAWINGS

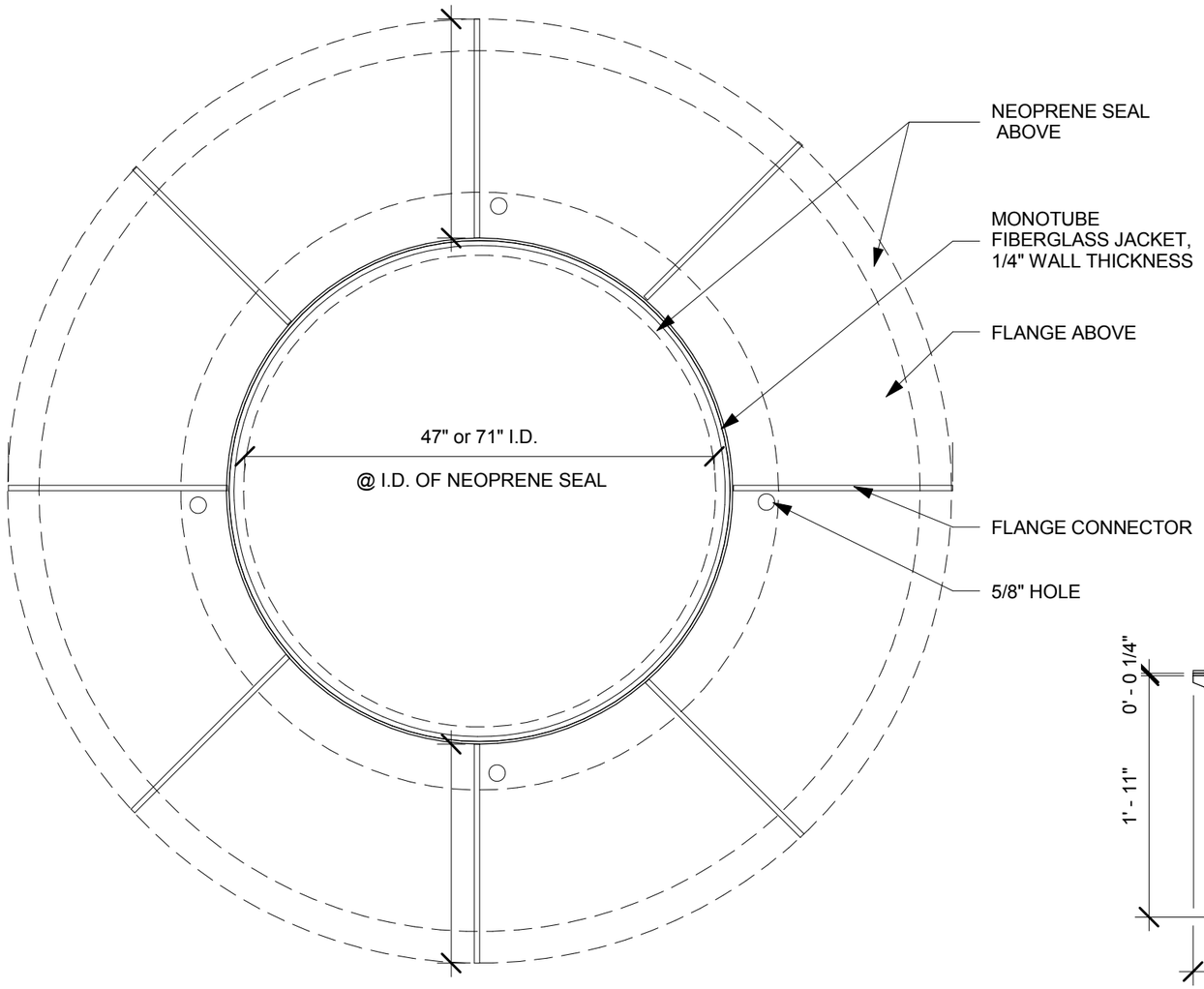
Tappan Zee Bridge: Main Span

Work Plan:
Install Panels
Soffit Panel

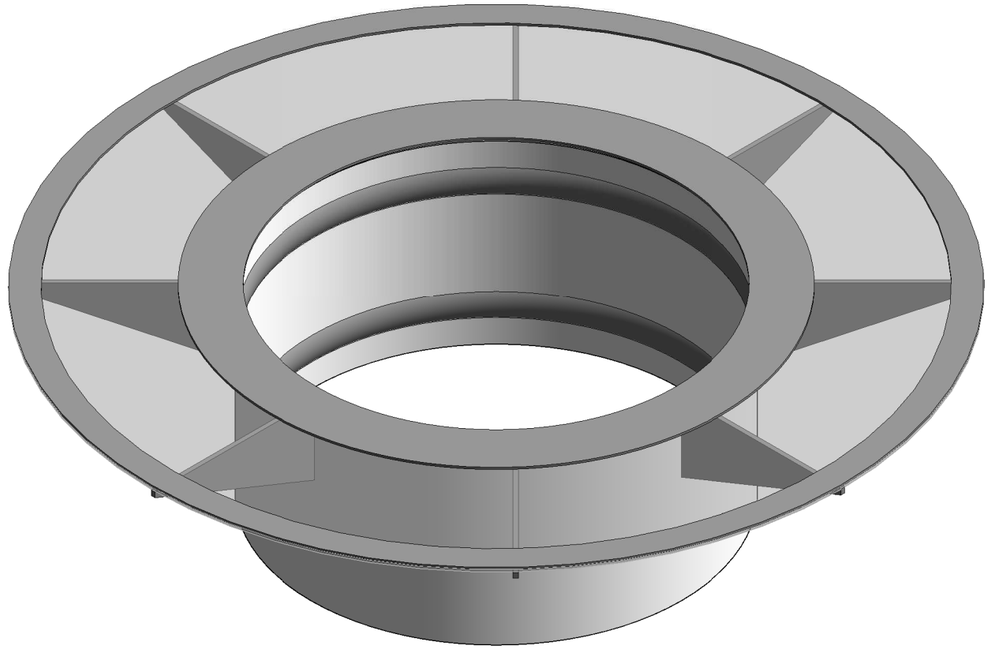
NOTE:

48" PILE = 49.5" I.D. + 20" FLANGE

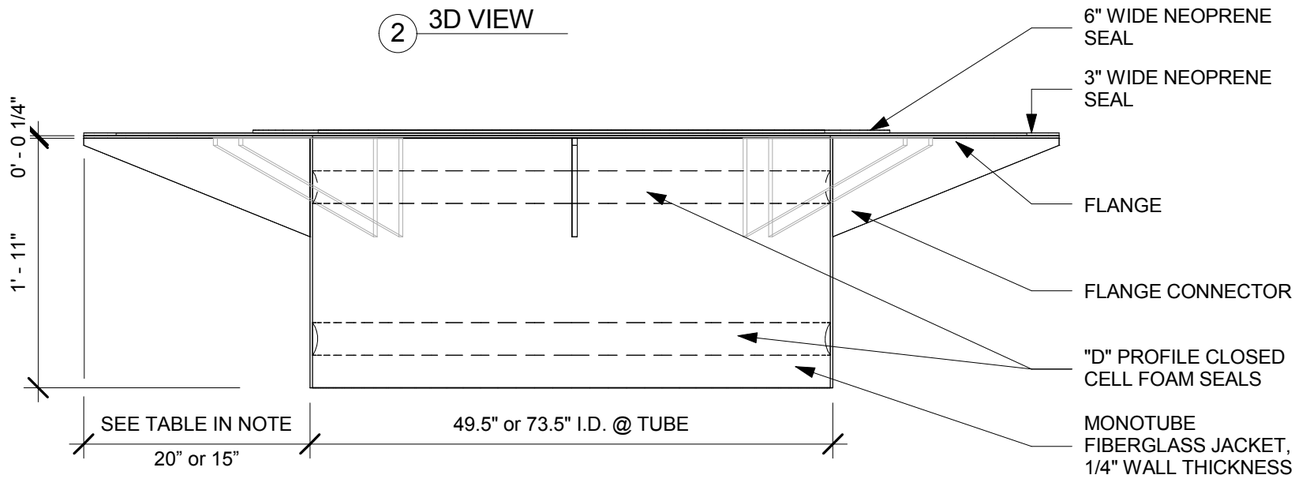
72" PILE = 73.5" I.D. + 15" FLANGE



1 TYPICAL PLAN
1 : 14



2 3D VIEW



3 TYPICAL ELEVATION
1 : 14

FIVE STAR MARINE

Five Star Marine, Inc.
750 Commerce Drive
Fairfield, CT. 06825
203.336.7919
www.5Star-Marine.com

TAPPAN ZEE CONSTRUCTORS
A Consortium of Fluor, American Bridge, Granite, and Traylor Bros.

New York State Thruway Authority

TAPPAN ZEE BRIDGE:
HUDSON RIVER CROSSING

47" & 71" MONOTUBE JACKET WITH NEOPRENE CONNECTION, OPTION 2

AL Project #	051 REVISITED	Customer Approval:
Date	10.08.13	
Drawn by	ASL	