moffatt & nichol

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ADDENDUM NO. 1

for

Whalehead Subdivision

Drainage Improvements - Phase VI

January 22, 2026

GENERAL:

1. This Addendum shall supplement, amend, and become a part of the Bid Documents. All Bids and the Construction Contract shall be based on these modifications.

2. Bidders shall acknowledge the receipt of this Addendum on their Form of Proposal.

SPECIFICATIONS:

The following revisions shall be noted by each Bidder in the appropriate specification section of the Bid Documents and made a part thereof:

1. There are no Specifications revisions associated with this Addendum.

DRAWINGS:

The following revisions shall be noted by each Bidder on the appropriate drawing of the Bid Documents and made a part thereof. Corrected Issued For Bid Drawings are issued with this Addendum.

1. Sheet EC101 has been revised to depict the existing fence line along Dolphin Street near the intersection of NC-12 as walked off during M&N's tour of each project site.
2. Sheet TC101 has been revised to depict the existing fence line along Dolphin Street near the intersection of NC-12 as walked off during M&N's tour of each project site. This sheet has also been revised based on NCDOT's preliminary comments that only the use of Drums are warranted for Traffic Control. The precast Concrete Barriers have been removed from use at the intersection of Dolphin Street and Corolla Drive and been replaced with Drums. The Traffic Control Notes, Traffic Control Steps, and Traffic Control Legend have been revised.
3. Sheets TC501 through TC503 have had the Precast Concrete Barrier details removed and replaced to reflect the use of either Drums or Skinny Drums.

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ADDITIONAL PROJECT SITE INFORMATION:

After the Pre-Bid Meeting, Moffatt & Nichol (M&N) visited each of the project sites and noted that a new utility has been installed within the subdivision. This new utility is RIPPLE FIBER and M&N has noted pedestals installed at the following intersections: Dolphin & Corolla; Dolphin & Whalehead; and Dolphin & Lighthouse.

This utility is not shown on the survey for this project and by way of this Addendum, the contractor is being advised of its existence. Contractor shall verify the location (horizontally and vertically) of this utility before starting any work at each project site. A photo of the Ripple Fiber pedestal is attached for your reference. The contact phone number on the pedestal is 800-359-5767.

MATERIALS SUBMISSION:

Currituck County received a pump materials submission from Jared Carpenter, a Xylem Sales Representative for Eastern NC, requesting that a FLYGT pump model be considered as an approved equal. After review of the provided pump documentation, the 3HP FLYGT pump model NP 3085 is approved by the Engineer and Currituck County as an approved equal. The pump documentation provided by Jared Carpenter is attached to this Addendum for your reference.

END OF ADDENDUM NO. 1

ATTACHMENTS:

- Minutes from the January 14, 2026 Pre-Bid Meeting
- Pre-Bid Meeting Attendee List
- Photo of Ripple Fiber pedestal from January 14, 2026
- Revised "Issued For Bid" plan sheets EC101 and TC101, and detail sheets TC501 through TC503.
- FLYGT pump documentation for 3HP model NP 3085

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PRE-BID MEETING MINUTES
for
Whalehead Subdivision
Drainage Improvements - Phase VI
Held at Bonito Street Public Beach Parking Lot near the Project Sites
located at
927 Whalehead Drive
Corolla, NC 27927
January 14, 2026 at 11:00 am to 11:30 am

LIST OF MEETING ATTENDEES:

The following individuals were in attendance at the project Pre-Bid Meeting. A copy of the sign-in sheet that was distributed during the meeting can be found as an attachment to these minutes.

ATTENDEE	REPRESENTING	PHONE	EMAIL
Kevin Zdeb	Moffatt & Nichol (M&N) Project Manager	(919) 781-4626 (O) (984) 239-2775 (D)	kzdeb@moffattnichol.com
Brad Haertling	Moffatt & Nichol (M&N) Assistant Project Manager	(919) 781-4626 (O) (919) 334-7964 (D)	bhaertling@moffattnichol.com
David Spence	Currituck County	(252) 232-2769 (P)	Dave.Spence@CurrituckCountyNC.gov
Eli Burge	Currituck County	(252) 232-2769 (P)	Elisha.Burge@CurrituckCountyNC.gov
Trischa Quinlan	Currituck County	(252) 232-6073 (P)	Trischa.Quinlan@CurrituckCountyNC.gov
Jared Carpenter	Xylem (Sales Rep)	(980) 579-2395 (M)	Jared.Carpenter@Xylem.com
Travis Swain	Fred Smith Company	(252) 722-3044 (M)	TSwain@FredSmithCompany.net
Nathaniel Hatchell	Hatchell Concrete	(252) 473-6074 (O)	HCI@HatchellConcrete.com
Taylor Barfield	Grizzly Underground	(757) 779-5704 (M)	Taylor@GrizzlyUU.org

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ITEMS DISCUSSED:

1. Introductions of all parties in attendance and everyone filled out the Attendee Sign-in Sheet provided by Currituck County.

2. The Notice to Bidders indicates how the plans, specifications, and contract documents may be obtained or viewed. Electronic versions of the documents were made available to the prospective contractors via email sent out by Currituck County on Tuesday December 30, 2025. Complete plans and specifications in digital (pdf) format can be obtained from Trischa Quinlan, Contracts & Purchasing Agent, via email request at Bids@CurrituckCountyNC.gov . This email address has been corrected.

3. Contractors are reminded that the contract documents (Notice to Bidders) call for the general contractor to be licensed in the State of **North Carolina** with one of the following classifications:

    A. Unclassified Contractor
    B. Highway Contractor
    C. Public Utilities Contractor
    D. Specialty Contractor – designated Water Lines and Sewer Lines construction

4. Sealed bids will be received by Currituck County until **11:00am,** Eastern Standard Time (EST), on **February 5, 2026** and immediately thereafter publicly opened and read at the Currituck County Court House. Currituck County will only accept contractor bids via mail and hand delivery up until that time. Any bid proposals received after 11:00am will NOT be accepted or reviewed. No emailed or faxed bids will be received. This project is bid as a single prime contract only. Contractors shall submit their bid proposals in a sealed envelope addressed to the County of Currituck and clearly indicate the following on the envelope:

    A. "SEALED BID ENCLOSED – WHALEHEAD SUBDIVISION DRAINAGE IMPROVEMENTS - PHASE VI"
    B. The Bidder's name and address

    A Bidder shall submit its Bid as indicated in the Notice to Bidders utilizing a two-envelope system.

Envelope One will contain the bid security only and should include "Bid Security" on the face of the envelope. Envelope Two will include the Bid Form and any other documents required to be submitted with the bid. Both envelopes shall be sealed separately.

Envelope One and Envelope Two shall be placed in a sealed envelope with the notation "SEALED BID ENCLOSED" and addressed to the County of Currituck. The project name, and the Bidder's name and address should also be identified on the face of the envelope.

Bids shall be submitted by the date and time and at the place specified in the Notice to Bidders. Bids received after the date and time specified will not be accepted. The Bidder assumes full responsibility for timely delivery.

5. The award of the contract will be based on the **LUMP SUM BASE BID PRICE** as noted on the Bid Form. The County may choose to award only Base Bid #1 or only Base Bid #2 or both Base Bids. Base Bid #1 – Dolphin Street is the sum of the Total Lump Sum Price (items 1 through 18) as indicated on the Bid Form. Base Bid #2 – Coral Street is the sum of the Total Lump Sum Price (items 19 through 45) as indicated on the Bid Form. The Total Lump Sum Price for both Base Bids is the sum of Base Bid #1 and Base Bid #2 as indicated on the Bid Form.

6. It is anticipated that all contract approvals and execution of contract documents will be completed in a timely manner between Currituck County and the awarded Contractor. A **Notice to Proceed** is expected to be issued by **mid to late March 2026**.

7. The project work must be completed BEFORE **May 1, 2026** or AFTER **September 14, 2026**. No work on-site may be conducted in between these dates. The contractor has 365 calendar days to complete both project sites from the Owner's written Notice to Proceed.

8. A cash deposit or bid bond in the amount of 5% of the bid shall accompany the formal proposal. The selected contractor will be required to furnish a performance bond and payment bond in the amount of 100% of the contract price. This information may also be found in the Notice to Bidders section of the contract documents.

9. No bid may be withdrawn after the scheduled closing time for receipt of bids for a period of 30 days.

10. All bidders must meet the licensing requirements under Chapter 87 of the N.C. General Statutes. Minority Owned Businesses, Small Business Entities, Women Owned Businesses, Veteran and Service-Disabled Veteran Owned Businesses are encouraged to submit bids.

11. Material lay-down area and equipment storage area for the Contractor will be the northern portion of the Bonito Street Public Beach Parking Lot utilizing the entrance on Whalehead Drive for access. Contractor shall provide temporary fencing and gate for access and delineation of the lay down area. The southern portion of the parking lot with access from Bonito Street shall remain open and undisturbed for public use and County access to the existing Lift Station.

12. The contractor will be responsible for furnishing, at his own expense, all necessary potable water, electrical power, and sanitary facilities. Metered connections to the local potable water utilities (Currituck County) may be available upon request.

13. Discussed a brief overview of the key elements of the project discussing the purpose, materials, installation, and sequence of the project.

    A. Purpose of the project. There are two (2) project sites to be addressed under this contract. Site 1 – Dolphin Street: The existing 6-inch Force Main shall be upsized to an 8-inch force main for increased capacity. Site 2 – Coral Beach Walk at Lighthouse Drive – a Drain Inlet and Lift Station with a 4-inch force main shall be installed to address the localized flooding issue.
    B. If the Contractor is awarded both project sites, Project Site 1 shall be the priority and completed first.
    C. All work for Site 1 shall be conducted within the R/W limits of Dolphin Street. Traffic Control shall be installed as shown on the plans and utilize Flaggers as needed. NCDOT has reviewed and provided feedback regarding traffic control devices noting that the Precast Concrete Barriers (PCB's) are not warranted and only require the use of Drums. Traffic-rated steel plates shall be installed over the open bore pits at the end of each workday. The Traffic Control plan and Detail Sheets have been revised and will be issued as an Addendum.
    D. Site 1 – Dolphin Street: The proposed 8-inch fusible HDPE force main shall be installed by HDD. Open bore pits are required at each end to conduct pilot drill and pull back of pipe as well as tie-ins to the existing pipe. Pipe assembly shall be conducted within the R/W of Dolphin Street between Corolla Drive and NC-12. Discussed that the existing fence along Dolphin Street near the intersection of NC-12 may be in the Dolphin Street R/W and in conflict with pipe assembly. If contractor

finds the fence is in conflict with operations - contractor has the option to remove, store, and then replace the fence in its original location after work is completed. Contractor shall verify the size and material type of existing 6-inch force main connection to the larger force main in Corolla Drive before ordering materials. Leakage testing of the assembled force main. Currituck County confirmed during the meeting that the existing Force Main along Corolla Drive is 14" O.D. HDPE with a DR of 9. Contractor will need to verify the existing 14" fitting type and material type of the fitting for the existing 6" Force Main connection and coordinate with Currituck County and Engineer prior to ordering any pipe materials.

E. All work for Site 2 shall be conducted within the R/W limits of Coral Street between Lighthouse Drive and Whalehead Drive and a portion of the Lighthouse Drive R/W. Traffic Control shall be installed as required and utilize Drums and Flaggers as needed along Lighthouse Drive and/or Whalehead Drive.
F. Site 2 – Coral Street: A drain inlet and 15-inch HDPE gravity pipe shall be installed within the R/W of Lighthouse Drive to collect localized flooding. The drainage pipe shall connect to a Lift Station installed outside of the Lighthouse Drive R/W and within the old Coral Street R/W. Lift Station shall pump stormwater via a 4-inch fusible HDPE force main to a flow dissipation structure in the existing infiltration pond. Demolition of existing driveway and construction of new concrete driveway. Installation of a back-up generator and electrical pad. Extension of Dominion Energy electrical service to electrical pad. Coordination with Dominion Energy. Leakage testing of the installed force main and start up testing of the Lift Station. Installation of landscaping and fencing. Relocation of existing boulders that line the existing driveway and frontage along Lighthouse Drive.
G. Contractor is responsible for all construction surveying and verifying the location of all existing utilities within both project sites. Contractor is responsible for the repairs to all damaged utilities during construction.
H. Contractor is responsible for the repairs to all damage caused to private property during construction.
I. Installation of Silt Fence around HDD bore pits as noted on the plans. Tree fencing shall be installed to delineate work areas.
J. Clearing and grubbing of the work areas to allow for construction.
K. Repairs and restoration of the Bonito Street Beach Access Parking Lot.
L. Installation and removal of temporary erosion control methods.
M. Seeding and mulching of the disturbed area once construction and testing has been completed.

14. The deadline for contractors to submit concerns and/or questions about this project is **January 22, 2026** at **5:00pm.** All contractor questions shall be submitted in writing via email to Trischa Quinlan, Contracts & Purchasing Agent (Bids@CurrituckCountyNC.gov). Formal responses to questions and any required project addendum will be provided to all known contractors via email by **January 28, 2026** at **5:00pm**.

15. Contractors were given the opportunity to discuss any questions they have about the project. All Contractors declined to ask questions at this time.

16. Invited all contractors to visit the project sites with the Designer and Owner representatives. All Contractors declined the site visit.

17. Discussed that the contractor is responsible for locating existing monuments and property pins to establish the existing R/W lines at both project areas.

18. Addendum #1 will be issued with these meeting minutes & attendee list and the revised traffic control plan and detail sheets.

END OF PRE-BID MEETING MINUTES

ATTACHMENTS:

- Pre-Bid Meeting Attendee List

County of Currituck
153 Courthouse Road
Currituck, North Carolina 27929

PRE-BID MEETING – CONTRACTOR SIGN-IN SHEET

Date: January 14, 2026
Time: 11:00 am
Project: Whalehead Subdivision Drainage Improvements- Phase VI

Name	Company	Phone Number	Email
Nathaniel Hatchell	HCI	252-473-6074	HCI@hatchellconcrete.com
Travis Sucin	FSC	252-722-3044	TSucin@FredSmithcompany.net
Jared Carpenter	Flygt/Xylem	980-579-2395	Jared.Carpenter@xylem.com
Taylor Barfield	Grizzly Underground	757-779-5104	Taylor@GrizzlyUU.org
KEVIN Zeb	Moffat & Nichol		Kzeb@moffatnichol.com
BRAD Hackney	"		BHackney@moffatnichol.com


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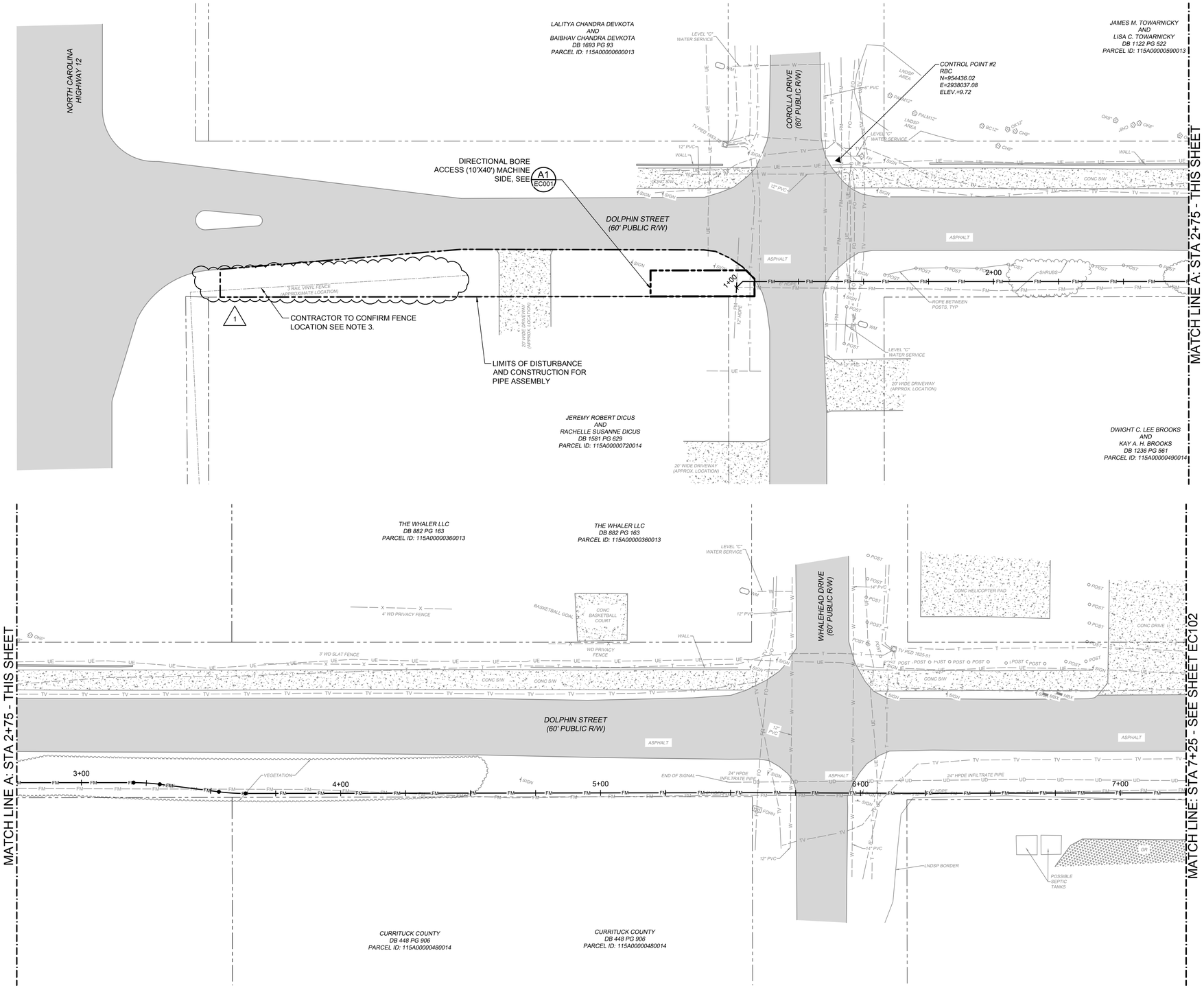
DOLPHIN ST
COROLLA DR



N

NOTES

1. SEE CONSTRUCTION PLAN SHEETS C-101 & C-102.
2. ROAD SHALL BE KEPT FREE FROM SOIL AND DEBRIS. SWEEP ROADS CLEAN DAILY AT THE END OF THE WORK DAY.
3. IF EXISTING FENCE IS LOCATED WITHIN THE ROAD RIGHT-OF-WAY AND WILL HINDER THE PIPE ASSEMBLY THE CONTRACTOR SHALL NOTIFY THE COUNTY. UPON RECEIVING APPROVAL THE CONTRACTOR SHALL REMOVE AND STORE THE EXISTING FENCE. ONCE CONSTRUCTION HAS BEEN COMPLETED THE CONTRACTOR SHALL REINSTALL STORED FENCING.

LEGEND OF EXISTING FEATURES

- PROPERTY / RIGHT OF WAY LINE
- WATER LINE
- U/G TELEPHONE
- U/G CABLE TV
- FIBER OPTIC
- U/G ELECTRIC
- STORM FORCE MAIN
- STORM PIPE
- STORM INFILTRATION PIPE
- FENCE
- MAJOR CONTOUR
- MINOR CONTOUR
- SPOT ELEVATION
- TREE
- BUSH
- WATER METER
- WATER VALVE
- FIRE HYDRANT
- TV PEDESTAL
- TELEPHONE PEDESTAL
- SIGN
- STORM MANHOLE
- ELECTRIC VAULT OR GENERATOR

EXISTING TREE ABBREVIATIONS

CD	CEDAR
CH	CHERRY
CM	CRAPE MYRTLE
OK	OAK
ORN	ORNAMENTAL
PN	PINE

LEGEND OF PROPOSED FEATURES

- STORM FORCE MAIN
- SPOT ELEVATION
- SURFACE WATER LIFT STATION
- PIG LAUNCH
- REDUCER
- GATE VALVE
- DETECTION WIRE MANHOLE
- AIR RELEASE VALVE
- FLOW DISSIPATION STRUCTURE
- DROP INLET
- FLOW DISSIPATION STRUCTURE
- TEMPORARY SILT FENCE

ISSUED FOR BID:
2025-12-22
NOT TO BE USED FOR CONSTRUCTION

CURRITUCK COUNTY 1668

No.	Description	Date	Appr
1	REVISED EXISTING FENCE LOCATION	01/19/2026	BAH

WHALEHEAD SUBDIVISION DRAINAGE IMPROVEMENTS PHASE 6

DOLPHIN STREET SEDIMENT AND EROSION CONTROL SHEET 1

moffatt & nichol
4700 FALLS OF NEUSE RD
SUITE 300
RALEIGH, NC 27609
919-781-4626
NC FIRM LICENSE NO. F-0105
WWW.MOFFATTNICHOL.COM

Designed by:	YSS
Drawn by:	DLK
Checked by:	KCZ
Reviewed by:	
Submitted by:	MOFFATT & NICHOL
Date:	NOVEMBER 2025
M&N Project No.	10293-02
Drawing code:	
Drawing Scale:	AS NOTED
Plot scale:	1:1 (0 SHEET)
Rev:	1

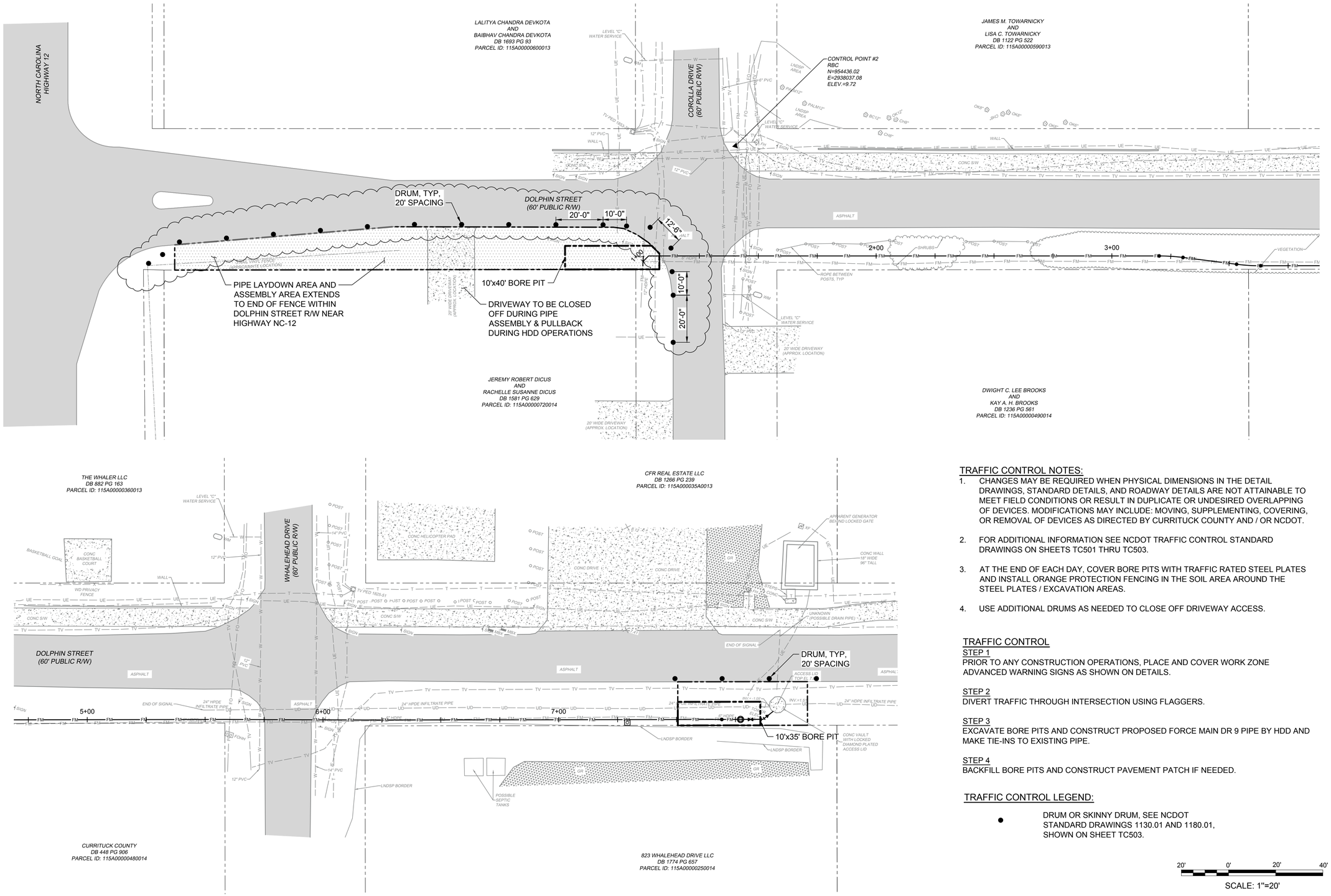
NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER K. E. V. I. N. C. Z. D. K. B.

SEAL

Sheet Reference No.
EC101
INDEX: 5 OF 28

File: Q:\R4\10293-02\20 CADD_Active_ Sheet\Set\10293002_EC101 - Plotted: 1/16/2026 12:43 PM by HAERTLING, BRAD - Saved: 1/16/2026 11:58 AM by BHAERTLING

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING



TRAFFIC CONTROL NOTES:

1. CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATIONS MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY CURRITUCK COUNTY AND / OR NCDOT.
2. FOR ADDITIONAL INFORMATION SEE NCDOT TRAFFIC CONTROL STANDARD DRAWINGS ON SHEETS TC501 THRU TC503.
3. AT THE END OF EACH DAY, COVER BORE PITS WITH TRAFFIC RATED STEEL PLATES AND INSTALL ORANGE PROTECTION FENCING IN THE SOIL AREA AROUND THE STEEL PLATES / EXCAVATION AREAS.
4. USE ADDITIONAL DRUMS AS NEEDED TO CLOSE OFF DRIVEWAY ACCESS.

TRAFFIC CONTROL

STEP 1
PRIOR TO ANY CONSTRUCTION OPERATIONS, PLACE AND COVER WORK ZONE ADVANCED WARNING SIGNS AS SHOWN ON DETAILS.

STEP 2
DIVERT TRAFFIC THROUGH INTERSECTION USING FLAGGERS.

STEP 3
EXCAVATE BORE PITS AND CONSTRUCT PROPOSED FORCE MAIN DR 9 PIPE BY HDD AND MAKE TIE-INS TO EXISTING PIPE.

STEP 4
BACKFILL BORE PITS AND CONSTRUCT PAVEMENT PATCH IF NEEDED.

TRAFFIC CONTROL LEGEND:

- DRUM OR SKINNY DRUM, SEE NCDOT STANDARD DRAWINGS 1130.01 AND 1180.01, SHOWN ON SHEET TC503.

20' 0' 20' 40'

SCALE: 1"=20'

ISSUED FOR BID:
2025-12-22
NOT TO BE USED FOR CONSTRUCTION

CURRITUCK COUNTY 1668

Rev.	Description	Date	Appr
1	REVISE TO USE DRUMS ONLY AS PER NCDOT COMMENTS	2026-01-19	KCZ

WHALEHEAD SUBDIVISION DRAINAGE IMPROVEMENTS PHASE 6

DOLPHIN STREET TRAFFIC CONTROL PLAN

Date: OCTOBER 2025
M&N Project No. 10293-02
Drawing code:
Drawing Scale: AS NOTED
Plot scale: 1:1 (0 SHEET)
Designed by: YSS
Dwn by: DLK
Ckd by: KCZ
Reviewed by:
Submitted by: MOFFATT & NICHOL

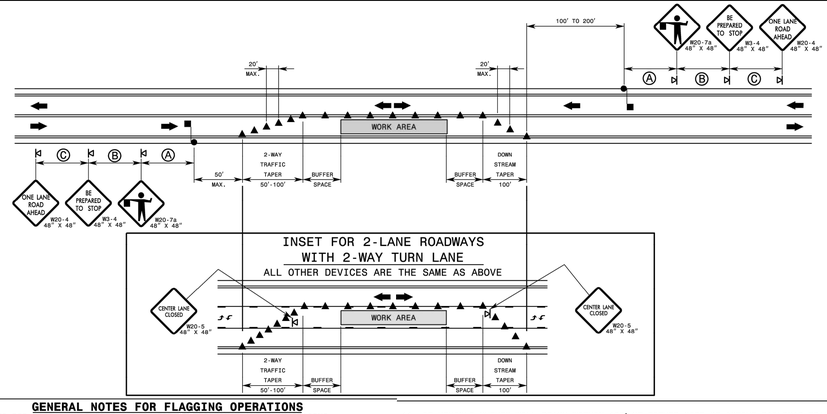
4700 FALLS OF NEUSE RD
SUITE 300
RALEIGH, NC 27609
919-781-4626
NC FIRM LICENSE NO. F-0105
WWW.MOFFATTNICHOL.COM
moffatt & nichol

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER K W I N C . Z H O U B .
SEAL

Sheet Reference No.
TC101
INDEX: 18 OF 28

File: Q:\RA\10293-02\20 CADD_Active_SheetSet\10293-02_TC101 - Plotted: 1/19/2026 7:08 AM by: HAERTLING, BRAD ; Saved: 1/16/2026 2:19 PM by: BHAERTLING

DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING



GENERAL NOTES FOR FLAGGING OPERATIONS

1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.

2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.

3- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

4- FOR POSTED SPEED LIMITS BELOW 45 MPH, CHANNELIZING DEVICE SPACING SHALL BE 20 FEET IN THE TAPERS AND THE SHIFTS AND 40 FEET IN THE TANGENTS. FOR POSTED SPEED LIMITS GREATER THAN OR EQUAL TO 45 MPH, CHANNELIZING DEVICE SPACING SHALL BE 40 FEET IN THE TAPERS AND THE SHIFTS AND 80 FEET IN THE TANGENTS.

5- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO RSD. 1101.11, SHEET 2).

6- DO NOT STOP ALL DIRECTIONS OF TRAFFIC FOR MORE THAN 5 MINUTES AT A TIME.

7- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD. 1180.01 FOR SKINNY DRUM REQUIREMENTS.

8- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7A) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER, FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.

9- REFER TO THE CURRENT MUTCD FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.

10- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

11- IF VEHICLE QUEUES WILL REACH WITHIN 100' OF EITHER SIDE OF ACTIVE RAILROAD TRACKS, PROVIDE A UNIFORMED LAW ENFORCEMENT OFFICER OR FLAGGER TO PREVENT VEHICLES FROM STOPPING WITHIN THE GRADE CROSSING. PROVIDE OFFICER OR FLAGGER EVEN IF AUTOMATIC WARNING MEASURES ALREADY EXIST.

12- THIS DETAIL IS APPLICABLE FOR OPERATIONS IN PLACE FOR 72 HOURS OR LESS. FOR LONGER DURATION OPERATIONS, SIGNING AND PAVEMENT MARKINGS MAY NEED TO BE ALTERED.

GENERAL NOTES FOR PILOT CAR OPERATIONS

1- USE PILOT CARS WHEN DIRECTED BY THE ENGINEER.

2- IF ROADWAY WIDTH IS LESS THAN 22 FEET (EOP TO EOP), CONES MAY NOT BE REQUIRED ALONG WORK AREA AND AT THE DISCRETION OF THE ENGINEER, CONES MAY BE OMITTED ALONG THE WORK AREA IF USING A PILOT CAR.

3- CONES ARE ALWAYS REQUIRED IN THE UPSTREAM AND DOWNSTREAM TAPERS.

4- MOUNT SIGN G20-4 "PILOT CAR FOLLOW ME" AT A CONSPICUOUS POSITION ON THE REAR OF THE PILOT VEHICLE.

5- UNLESS APPROVED BY THE ENGINEER, DO NOT INSTALL MORE THAN ONE (1) MILE OF LANE CLOSURE, MEASURED FROM THE BEGINNING OF THE MERGE TAPER TO THE END OF THE LANE CLOSURE.

6- ADVISE RESIDENTS AND BUSINESSES WITHIN THE LANE CLOSURE LIMITS ABOUT METHODS OF SAFE EGRESS AND INGRESS FROM DRIVEWAYS DURING FLAGGING AND PILOT CAR OPERATIONS.

LEGEND
- FLAGGER
- CONE
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

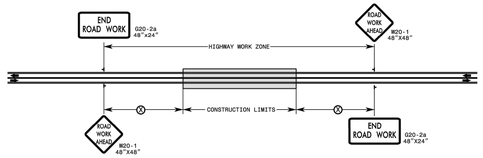
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
2-LANE, 2-WAY ROADWAY-1 LANE CLOSED

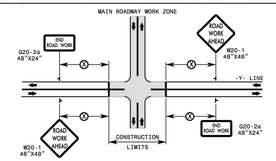
SHEET 1 OF 19
1101.02

TWO-WAY UNDIVIDED (L-LINES)



POSTED SPEED LIMIT (MPH)	RECOMMENDED MINIMUM SIGN SPACING X
≤ 50	500'
55	1000'

ROADWAYS INTERSECTING ALONG TWO-WAY UNDIVIDED WORK ZONE (Y-LINES)



NO STATIONARY -Y- LINE ADVANCE WARNING SIGNAGE IS REQUIRED UNLESS THERE IS MORE THAN 1000' OF CONSTRUCTION ALONG THE -Y- LINE.

GENERAL NOTES

1- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.

2- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 72 CONSECUTIVE HOURS.

3- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.

4- ERECT SIGNS PER RSD 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.

5- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD. 1110.01.

6- DO NOT BACK BRACE SIGN SUPPORTS.

LEGEND
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW

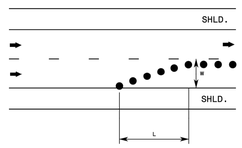
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
WORK ZONE ADVANCE WARNING SIGNS FOR TWO-WAY UNDIVIDED FACILITIES

SHEET 3 OF 3
1101.01

EXAMPLE OF "L" & "W" DESIGNATIONS



TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPER	
MERGING TAPER	L MINIMUM
SHIFTING TAPER	½ L MINIMUM *
SHOULDER TAPER	⅓ L MINIMUM
TWO-WAY TRAFFIC TAPER	50 - 100 FEET MAXIMUM
DOWNSTREAM TAPER	100 FEET MAXIMUM

DO NOT INTRODUCE A MERGING OR SHIFTING TAPER WITHIN A CURVE OF THE ROADWAY

*USE FULL L FOR CONTROLLED-ACCESS FACILITIES UNLESS RESTRICTED BY FIELD CONDITIONS AS DETERMINED BY THE TRAFFIC CONTROL SUPERVISOR OR THE ENGINEER.

QUICK REFERENCE - "L" DISTANCE TABLE

MINIMUM LONGITUDINAL DISTANCE "L" (FEET) (ROUNDED VALUES)

POSTED SPEED "S" (MPH)	LATERAL WIDTH "W" (FEET) 1	2	3	4	5	6	7	8	9	10	11	12
20	10	15	20	30	35	40	50	55	60	70	75	80
25	15	25	35	45	55	65	75	85	95	105	115	125
30	15	30	45	60	75	90	105	120	135	150	165	180
35	25	45	65	85	105	125	145	165	185	205	225	245
40	30	55	80	110	135	160	190	215	240	270	295	320
45	45	90	135	180	225	270	315	360	405	450	495	540
50	50	100	150	200	250	300	350	400	450	500	550	600
55	55	110	165	220	275	330	385	440	495	550	605	660
60	60	120	180	240	300	360	420	480	540	600	660	720
65	65	130	195	260	325	390	455	520	585	650	715	780
70	70	140	210	280	350	420	490	560	630	700	770	840

GENERAL NOTES

1- TABLE FOR "L" DISTANCE IS BASED ON CHANNELIZATION TAPER FORMULA FROM THE MUTCD. WHERE:

SPEED LIMIT	FORMULA
40 MPH OR LESS	$L_{MIN} = \frac{W \times S^2}{60}$
45 MPH OR GREATER	$L_{MIN} = W \times S$

L = MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)
W = WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)
S = EXISTING POSTED SPEED LIMIT PRIOR TO THE IMPLEMENTATION OF A WORK ZONE SPEED LIMIT REDUCTION

2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

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

1-24

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
"L" DISTANCE AND CHANNELIZING DEVICE TAPER CRITERIA

SHEET 1 OF 4
1101.11

DESIGN SPEED (MPH)	MINIMUM SIGHT DISTANCE STOPPING SIGHT DISTANCE (FEET)	MINIMUM SIGHT DISTANCE PASSING SIGHT DISTANCE (FEET)	MINIMUM LONGITUDINAL BUFFER SPACE (FEET)
30	200	1090	85
35	250	1280	120
40	305	1470	155
45	360	1625	195
50	425	1835	240
55	495	1985	290
60	570	2135	345
65	645	2285	405
70	730	2480	470
75	820	2580	540
80	910	2680	615

GENERAL NOTES

1- TABLES ARE BASED ON THE AASHTO GREEN BOOK "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". MINIMUM SIGHT DISTANCE VALUES ARE FOR PASSENGER CAR VEHICLES ON WET AND LEVEL ROADWAYS. CONSULT THE AASHTO GREEN BOOK TO MAKE FINAL DETERMINATION OF STOPPING SIGHT DISTANCE REQUIREMENTS.

2- BUFFER SPACE TABLE IS BASED ON THE BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS.

3- USE OF STOPPING SIGHT DISTANCE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE FOR TRAFFIC APPROACHING A LANE CLOSURE. PROVIDE 2-LANE, 2-WAY ROADWAYS STOPPING SIGHT DISTANCE TO THE FLAGGER. FOR LANE CLOSURES ON MULTILANE ROADWAYS PROVIDE STOPPING SIGHT DISTANCE TO THE BEGINNING OF THE LANE CLOSURE MERGE TAPER, OR FLASHING ARROW BOARD. EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED.

4- USE OF MINIMUM PASSING SIGHT DISTANCE TABLE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE REQUIREMENTS FOR PLACEMENT OF PAVEMENT MARKING PASSING/NO-PASSING ZONES FOR 2-LANE, 2-WAY ROADWAYS.

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ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
BUFFER SPACE & SIGHT DISTANCE

SHEET 2 OF 4
1101.11

NOTES:
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2025-12-22
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CURRITUCK COUNTY 1668

No.	Description	Date	Appr
1	REVISE DETAILS NEEDED DUE TO REVISED TC PLAN	2026-01-05	KCZ
Mark			

WHALEHEAD SUBDIVISION DRAINAGE IMPROVEMENTS PHASE 6

TRAFFIC CONTROL DETAILS SHEET 1

4700 FALLS OF NEUSE RD
SUITE 300
RALEIGH, NC 27609
919-781-4626
NC FIRM LICENSE NO. F-0105
WWW.MOFFATTNICHOL.COM
moffatt & nichol

Designed by:	YSS
Drawn by:	DLK
Checked by:	KCZ
Reviewed by:	
Submitted by:	MOFFATT & NICHOL
Date:	OCTOBER 2025
M&N Project No.	10293-02
Drawing code:	
Drawing Scale:	AS NOTED
Plot scale:	1:1 (D SHEET)
Rev.	0

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER K. C. ZIEGLER N C

SEAL

Sheet Reference No.
TC501
INDEX: 19 OF 28

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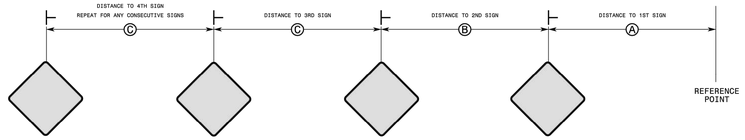
DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING

ADVANCE WARNING SIGN SPACING CHART			
POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS (FEET)±		
	Ⓐ	Ⓑ	Ⓒ
≤ 35	200	200	200
40-50	350	350	350
55	500	500	500
CONTROLLED ACCESS ROADS (≥ 55)	1000	1500	2700

STATIONARY OR PORTABLE SIGNS



GENERAL NOTES

1- REFER TO THE LATEST EDITION OF THE MUTCD.

2- USE THIS STANDARD DRAWING IN CONJUNCTION WITH OTHER TRAFFIC CONTROL ROADWAY STANDARD DRAWINGS WHERE SIGN SPACING DISTANCES A, B, C, ARE SPECIFIED.

3- APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.

STATE OF NORTH CAROLINA
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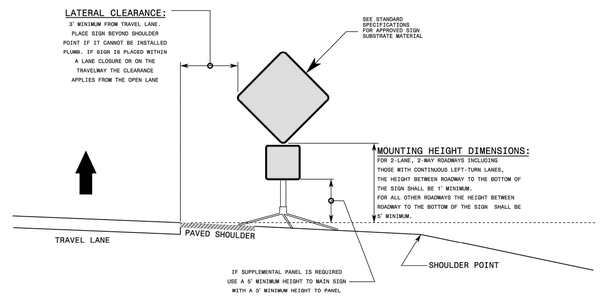
RALEIGH, N.C.

1-24

ROADWAY STANDARD DRAWING FOR
TRAFFIC CONTROL DESIGN TABLES
SPACING OF TEMPORARY SIGNS IN SERIES

SHEET 4 OF 4
1101.11



GENERAL NOTES

1- DIMENSIONS SHOWN ARE MINIMUM VALUES. MOUNT SIGNS SO THEY WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC EVEN WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS.

2- USE PORTABLE WORK ZONE SIGNS AND STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER.

3- ALL PORTABLE WORK ZONE SIGNS AND STANDS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

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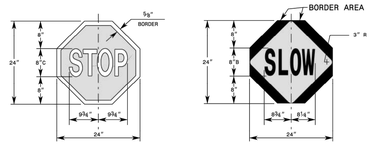
RALEIGH, N.C.

1-24

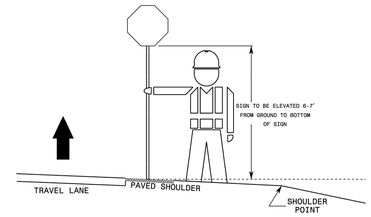
ROADWAY STANDARD DRAWING FOR
PORTABLE WORK ZONE SIGNS
MOUNTING HEIGHT & LATERAL CLEARANCE

SHEET 1 OF 1
1110.02

STOP/SLOW PADDLE



FLAGGER AND PADDLE PLACEMENT



GENERAL NOTES

1- USE HAND SIGNALING DEVICES SUCH AS STOP-SLOW PADDLES, FLASHLIGHTS TO CONTROL TRAFFIC. USE STOP-SLOW PADDLES AS THE PRIMARY DEVICE.

2- FABRICATE STOP-SLOW PADDLES FROM SHEET METAL OR OTHER LIGHT SEMI RIGID MATERIAL. PROVIDE A RIGID HANDLE OF SUFFICIENT LENGTH SO THE PADDLE IS HELD AT 6-7' ABOVE GROUND LEVEL.

3- PROVIDE STOPPING SIGHT DISTANCE TO EACH FLAGGER STATION. REFER TO RSD. 1101.11, SHEET 2.

4- ILLUMINATE FLAGGER STATIONS DURING NIGHT OPERATIONS.

5- FOLLOW FLAGGER QUALIFICATIONS AND METHODS OF HAND-SIGNALING PROCEDURES IN ACCORDANCE WITH PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

6- ALL FLAGGERS MUST BE CERTIFIED BY AN NCDOT APPROVED TRAINING RESOURCE.

STATE OF NORTH CAROLINA
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1-24

ROADWAY STANDARD DRAWING FOR
FLAGGERS

SHEET 1 OF 1
1150.01

NOTES:

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2. CONTRACTOR SHALL VERIFY ALL STANDARDS ARE THE LATEST VERSION AVAILABLE FROM THE DESIGNATED AGENCY.

ISSUED FOR BID:
2025-12-22
NOT TO BE USED FOR CONSTRUCTION

CURRITUCK COUNTY 1668

Rev.	Description	Date	Appr
1	REVISE DETAILS NEEDED DUE TO REVISED TC PLAN	2026-01-06	KCZ

WHALEHEAD SUBDIVISION DRAINAGE IMPROVEMENTS PHASE 6

TRAFFIC CONTROL DETAILS SHEET 2

4700 FALLS OF NEUSE RD
SUITE 300
RALEIGH, NC 27609
919-781-4626
NC FIRM LICENSE NO. F-0105
WWW.MOFFATTNICHOL.COM
moffatt & nichol

Designed by:	YSS
Drawn by:	DLK
Ckd by:	KCZ
Reviewed by:	
Submitted by:	MOFFATT & NICHOL
Date:	OCTOBER 2025
M&N Project No.	10293-02
Drawing code:	
Drawing Scale:	AS NOTED
Plot scale:	1:1 (D SHEET)
Rev.	0

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER BRIAN D. BOYD
SEAL

Sheet Reference No.
TC502
INDEX: 20 OF 28

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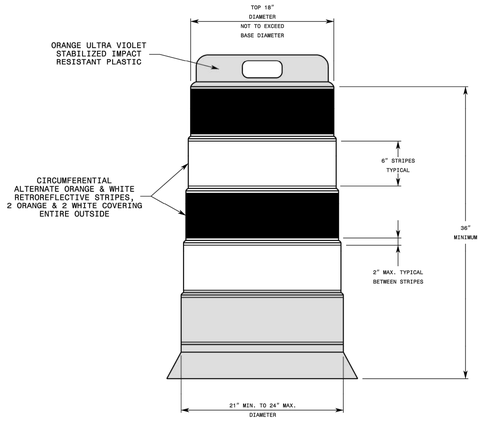
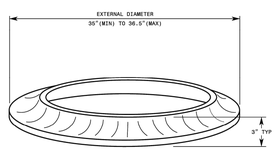
DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING



TIRE BALLAST



ALL RUBBER COLLARS MUST BE BLACK IN COLOR AND FREE OF ANY COLORED PAINT

BALLAST COLLAR SHOULD HAVE GOOD CONTACT WITH THE BARREL FLANGE AND BALLAST OUTER EDGE MUST LAY FLAT WITH ROAD SURFACE

DRUMS THAT USE TIRE BALLASTS ARE MANUFACTURED SPECIFICALLY FOR THAT PURPOSE - DO NOT USE TIRE BALLASTS WITH OTHER DRUM DESIGNS.

GENERAL NOTES

1- BALLASTING SHALL BE ACHIEVED BY THE SAND BAG, TIRE-SIDEWALL, OR PREFORMED WEIGHTED BASE METHODS. USE THE TIRE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE DRUM.

2- IF NECESSARY PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON NON-RETROREFLECTIVE DRUM SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT.

3- ALL DRUMS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCT LIST.

4- REFER TO THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR ADDITIONAL INFORMATION.

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

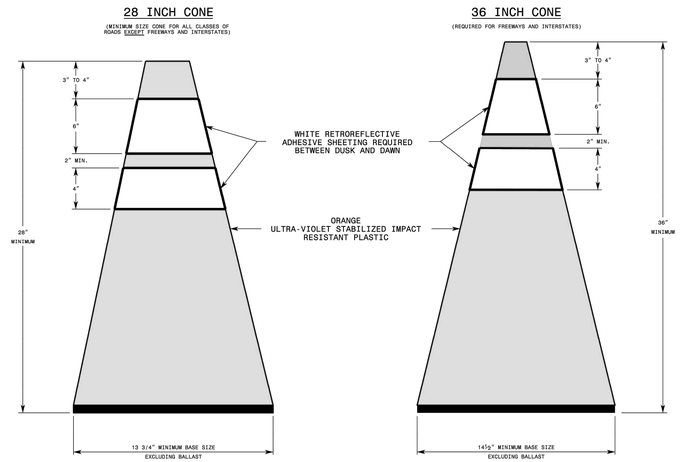
1-24

ROADWAY STANDARD DRAWING FOR
DRUMS

SHEET 1 OF 1
1130.01

28 INCH CONE
(MINIMUM SIZE CONE FOR ALL CLASSES OF ROADS EXCEPT FREEWAYS AND INTERSTATES)

36 INCH CONE
(REQUIRED FOR FREEWAYS AND INTERSTATES)



GENERAL NOTES

1- ACHIEVE BALLASTING BY USING SPECIAL WEIGHTED BASES SUCH AS SAND BAG RINGS, DOUBLING CONES, OR BASES THAT CAN BE FILLED WITH BALLAST. SEVENTY PERCENT OF THE WEIGHT OF THE CONE MUST BE IN THE BASE. USE BALLAST'S THAT DO NOT PRESENT A HAZARD WHEN STRUCK.

2- ALL CONES MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

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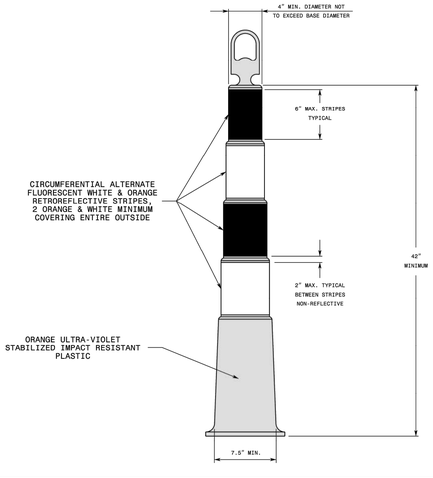
RALEIGH, N.C.

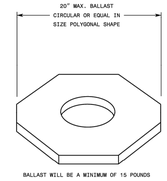
1-24

ROADWAY STANDARD DRAWING FOR
CONES

SHEET 1 OF 1
1135.01



TYPICAL BALLAST



BALLAST WILL BE A MINIMUM OF 15 POUNDS

GENERAL NOTES

1- USE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE DRUM.

2- IF NECESSARY, PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON NON-RETROREFLECTIVE SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT.

3- REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR ADDITIONAL REQUIREMENTS.

4- ALL SKINNY DRUMS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

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

1-24

ROADWAY STANDARD DRAWING FOR
SKINNY DRUMS

SHEET 1 OF 1
1180.01

NOTES:
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ISSUED FOR BID:
2025-12-22
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CURRITUCK COUNTY
1668

No.	Description	Date	Appr
1	REVISE DETAILS NEEDED DUE TO REVISED TC PLAN	2026-01-05	KCZ
Mark			

WHALEHEAD SUBDIVISION DRAINAGE IMPROVEMENTS PHASE 6

TRAFFIC CONTROL DETAILS SHEET 3

Rev. 0
Date: OCTOBER 2025
M&N Project No. 10293-02
Drawing scale:
Drawing Scale: AS NOTED
Plot scale: 1:1 (D SHEET)
Designed by: YSS
Drwn by: DLK
Ckd by: KCZ
Reviewed by:
Submitted by: MOFFATT & NICHOL

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NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZOLNIER
SEAL

Sheet Reference No.
TC503
INDEX: 21 OF 28

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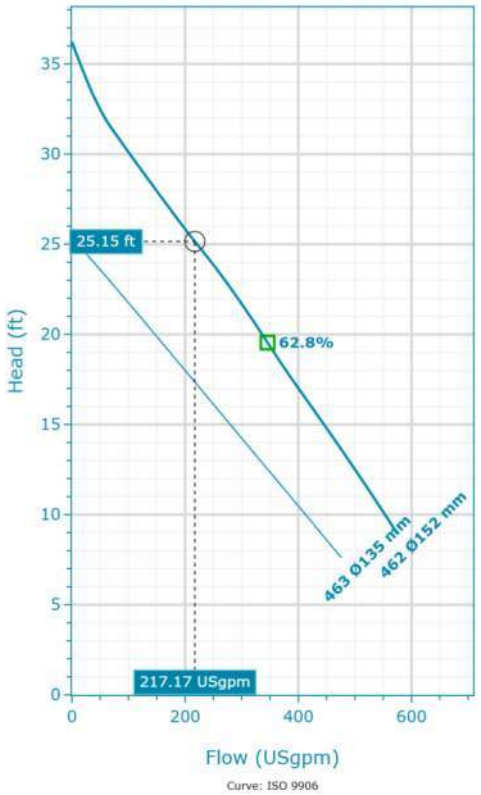
DRAWING SCALES SHOWN BASED ON 22"x34" DRAWING

xylem
Let's Solve Water

NP 3085 MT 3~ ADAPTIVE 462

Created On: 1/8/26

NP 3085 MT 3~ Adaptive 462 | Configuration Summary



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for additional performance guarantees.

Flygt's self-cleaning non-clog N-pumps feature innovative designs and functions that deliver high sustained efficiency and the most reliable operation. This makes them the most reliable choice available for a broad range of wastewater applications for tough applications such as unscreened sewage, wastewater and sludge up to an 8 percent solids concentration. Impeller material available in Hardened cast Iron, Hard Iron and Stainless Steel to fit any wastewater application.

GENERAL

Explosion Proof
Yes

Max. Pumped Media Temp.
104 °F

Approval
FM

Impeller Diameter
152 mm

MATERIAL AND COATING

Impeller Material
Hard-Iron

Stator Cover Material
Grey Cast Iron

Volute Material
Grey Cast Iron

MOTOR

Rated Voltage
208 V

Motor Efficiency Class
Standard

Coupling
Y

Rated Power
3 Hp

INSTALLATION

Installation Type
P - Semi-Permanent, Wet

Project:	Created By:	Created On:	Last Update:
NP 3085 MT 3~ Adaptive 462	Jared Carpenter	1/8/26	-

NP 3085 MT 3~ Adaptive 462 | Product Details

Description

N 3085

Wastewater N-Technology Pump With Adaptive N® Impeller

Flygt N-pumps take on the toughest applications and get the job done. Every component is designed and manufactured to deliver sustained high efficiency. Thanks to patented N-technology with its innovative self-cleaning impeller, Flygt N-pumps deliver the highest total efficiency. They lower your energy bill and reduce unplanned maintenance costs. That adds up to total peace of mind – and big savings over the long term. Most solid objects entering the pump will pass through the impeller between the impeller vanes. If an object gets caught on the leading edge of one of the vanes, it will slide along the backswept shape towards the perimeter of the inlet. Due to the mechanical self-cleaning design, a sludge concentration up to 8% can easily be pumped.

Flexible and Modular Design

- This self-cleaning pump features innovative functions that make it the best choice for a broad range of applications. The modular hydraulic design enables you to tailor the hydraulics to meet the requirements of virtually any application.
- Replaceable wear ring in two materials, gray iron or Hard-Iron, for different operation conditions
- Hardened gray iron impeller for typical wastewater applications
- Hard-Iron impeller for abrasive and corrosive applications
- Stainless steel impeller for special applications that require duplex stainless steel
- Short shaft overhang reduces shaft deflection and increases seal and bearing life
- Motor designed for submersible use. Heat is concentrated to the stator core for improved cooling properties
- The double mechanical seal system consists of two sets of mechanical shaft seals that work independently to provide double security. Available in Tungsten carbide (WCCR) or Silicone carbide (SiC) depending on pumped media.
- Griploc mechanical face seal system secures locking to the shaft, no rubber friction, no grub screws and no shaft damage
- Motor cable SUBCAB ® specially developed for submersible use.

Product Features

- Sustained high efficiency
- Hardened cast iron, optional Duplex stainless steel and Hard-Iron impellers
- State-of-the-art wastewater pump with enhanced Adaptive N® hydraulic
- Sustained high efficiency with energy savings up to 25%
- Flexible and modular design
- Robust and reliable

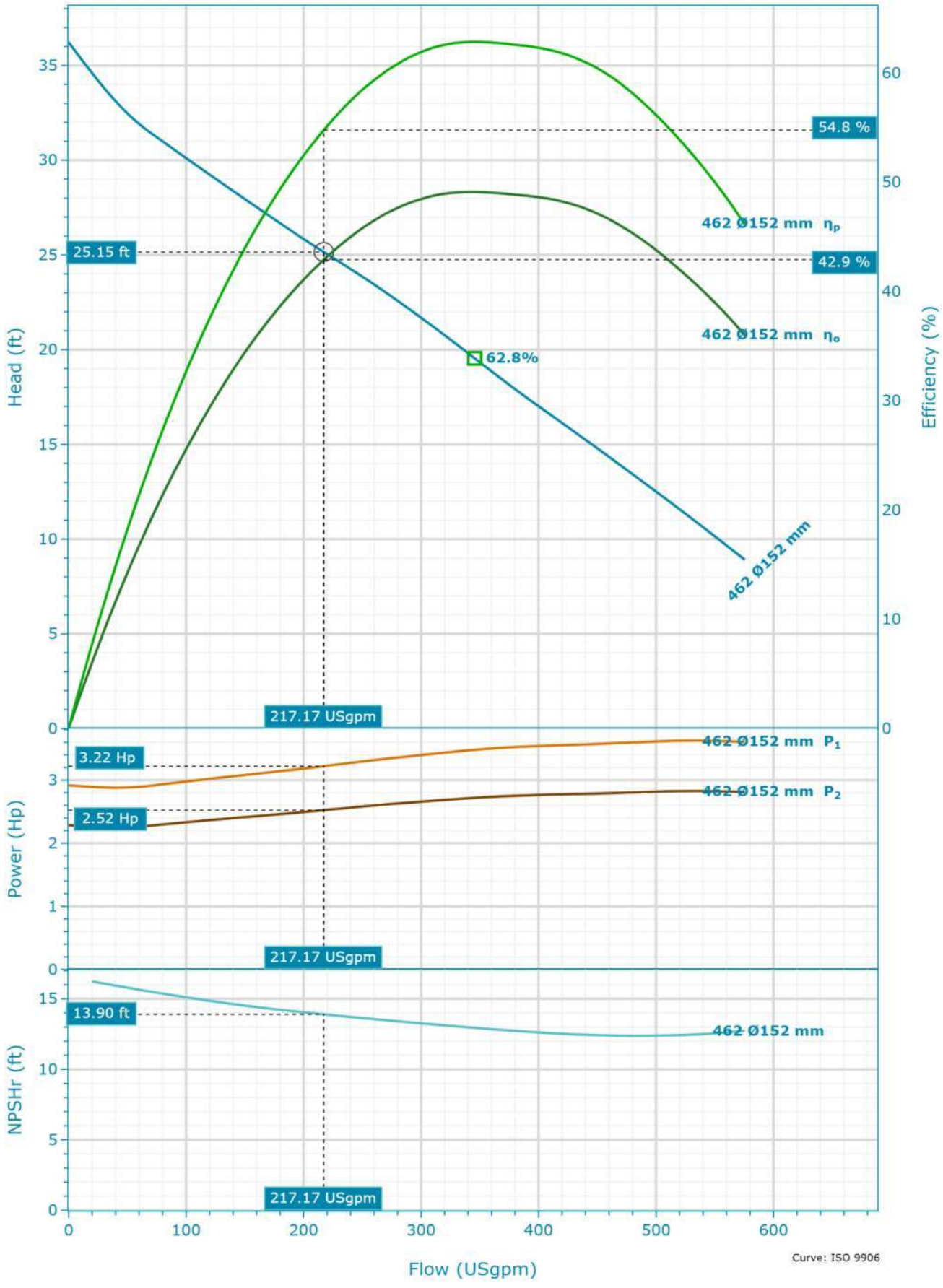
Construction Materials

Impeller Material	Volute Material	Stator Cover Material
Hard-Iron	Grey Cast Iron	Grey Cast Iron

Motor

Rated Power	Number Of Phases	Start Current Ratio	Motor Issue
3 Hp	3	5.45	10
Motor Denomination	Rated Motor Speed	Insulation Class	Locked Rotor Code
15-10-4AL	1,700 RPM	H	H
Motor Efficiency Class	Rated Voltage	Approval	Max starts per hour
Standard	208 V	FM	30
Version Code	Rated Current	Total moment of inertia	Power Factor 100%
070	9.6 A	0.48 ft²lbf	0.83
Frequency	Start Current	Type of duty	Power Factor 75%
60 Hz	53 A	S1	0.77
Max P2 (1x)	Starting Current, Direct Starting	Stator Variant	Power Factor 50%
2.83 Hp	53 A	68	0.66
Number Of Poles	Starting Current, Star Delta	Motor Module	Efficiency 100%
4	17.67 A	147	77.8 %
			Efficiency 75%
			78.9 %
			Efficiency 50%
			77.3 %

NP 3085 MT 3~ Adaptive 462 | Hydraulic Data & Performance Curve



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for additional performance guarantees.

Project:	Created By:	Created On:	Last Update:
NP 3085 MT 3~ Adaptive 462	Jared Carpenter	1/8/26	-

Selection

Series N 3000	Curve Code 462
Name NP 3085 MT 3~ Adaptive 462	Impeller Diameter 152 mm
Frequency 60 Hz	Inlet Diameter 100 mm
Total Flow 150 USgpm	Outlet Diameter 3 in
Total Head 12 ft	Number Of Vanes 2
Pump Flow 150 USgpm	
Pump Head 12 ft	
System Type Single Pump	
Operating Pumps 1	
Standby Pumps No Standby Pump	

Fluid and Operating Conditions

Fluid Type Water	Density 62.43 lb/ft³
Fluid Temperature 39.2 °F	Dynamic Viscosity 1.57 cP
Specific Gravity 1	Fluid Vapor Pressure 0.27 feet
	Atmospheric Pressure 33.91 feet
	Elevation 0 ft
	Ambient Temperature 68 °F
	NPSH Available 33.68 ft
	Submergence 0 ft

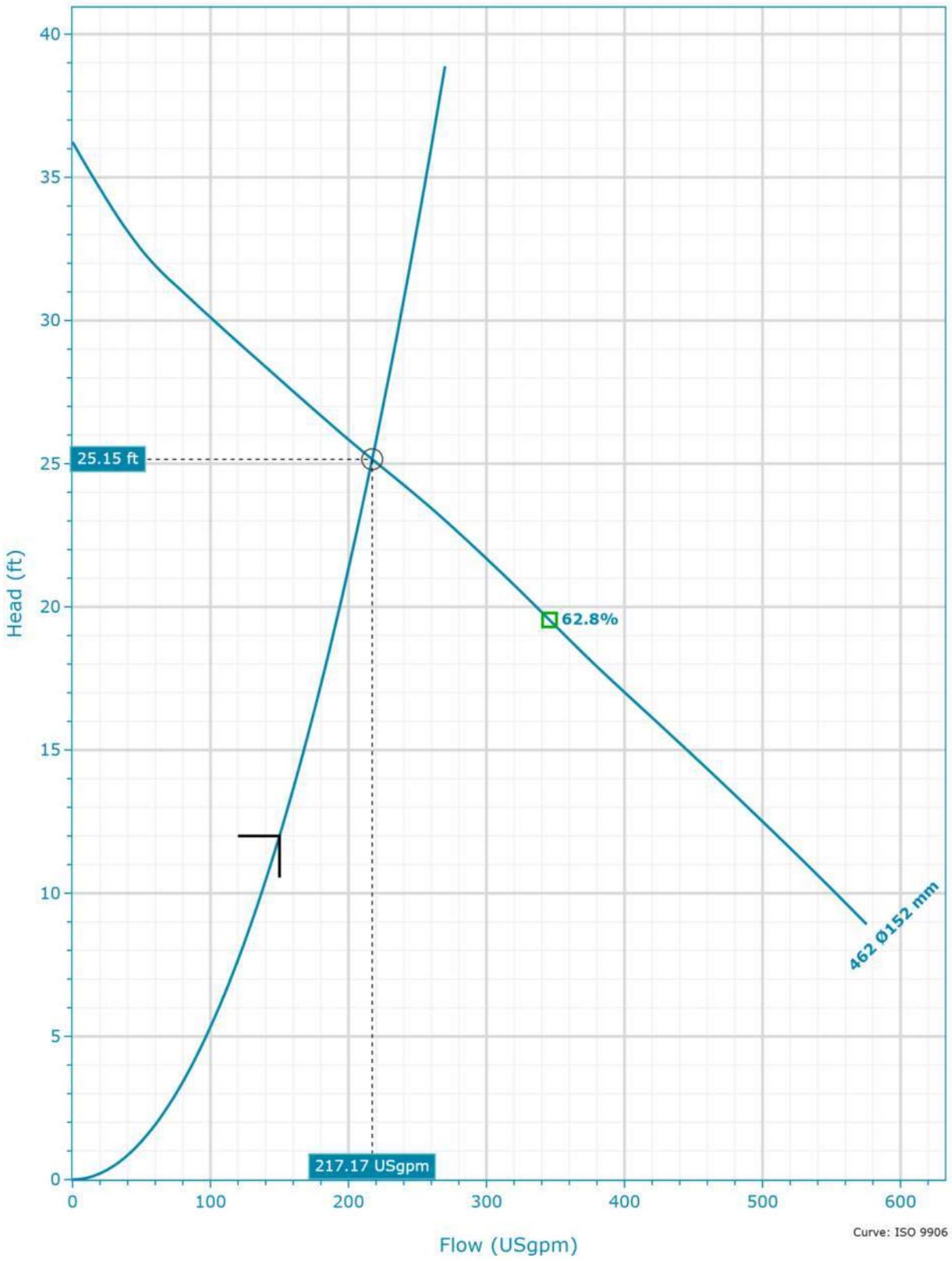
Design Point

Flow 217.17 USgpm	Shaft power (P2) 2.52 Hp
Head 25.15 ft	NPSHR 13.9 ft
Overall Efficiency (ηo) 42.91 %	Flow To BEP Ratio 62.83 %
Pump Efficiency (ηp) 54.77 %	
Input Power (P1) 3.22 Hp	

Design Curve

Rated Speed 60 Hz	BEP Flow 345.66 USgpm
Max Flow 575.48 USgpm	BEP Head 19.54 ft
H@QMin 36.23 ft	Max P2 2.83 Hp
H@QMax 8.91 ft	Specific Energy 184.32 kWh/mGal
BEP 62.84 %	

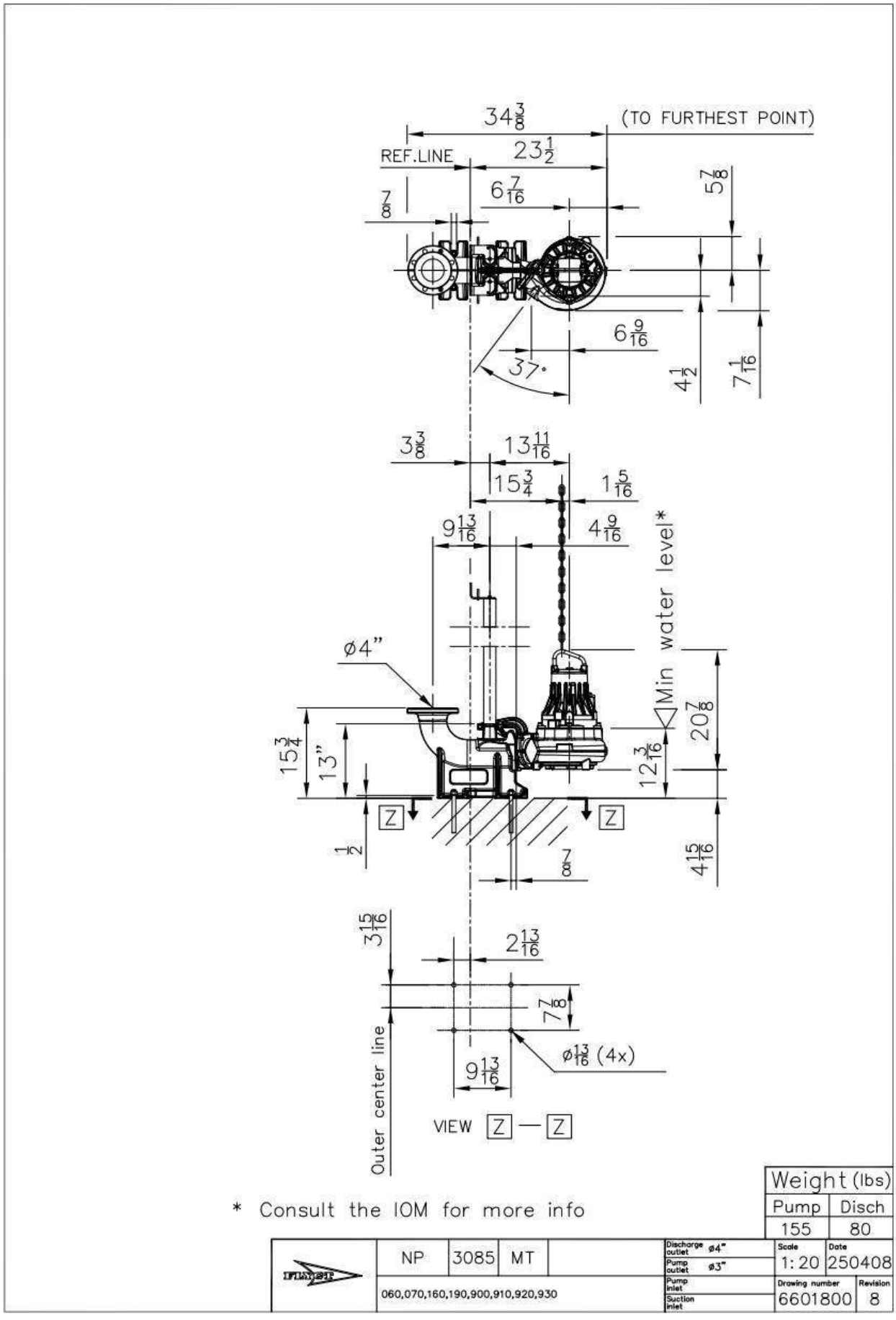
NP 3085 MT 3~ Adaptive 462 | Duty Analysis



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for additional performance guarantees.

Name	Q (1x) [USgpm]	H (1x) [ft]	P2 (1x) [Hp]	Q [USgpm]	H [ft]	P2 [Hp]	ηp [%]	SE [kWh/mGal]	NPSHr [ft]
DP1 @ 1x	217.17	25.15	2.52	217.17	25.15	2.52	54.77	184.32	13.9

NP 3085 MT 3~ Adaptive 462 | Dimensional Data & Drawing



* Consult the IOM for more info

Weight (lbs)	
Pump	Disch
155	80

FLYGT	NP	3085	MT	Discharge outlet ø4"	Scale	Date
				Pump outlet ø3"	1:20	250408
	060,070,160,190,900,910,920,930			Pump inlet	Drawing number	Revision
				Suction inlet	6601800	8

Company	Xylem
Contact	Jared Carpenter
Phone No.	+19805792395
Email	jared.carpenter@xylem.com

xylem
Let's Solve Water

N 3085.060/070 SPECIFICATION

REQUIREMENTS
Furnish and install ___ submersible non-clog wastewater pump(s). Each pump shall be equipped with a 3 HP, submersible electric motor connected for operation on 208 volts, 3 phase, 60 hertz, wire service, with 50feet of submersible cable (SUBCAB) suitable for submersible pump applications. The power cable shall be sized according to NEC and ICEA standards and also meet with P-MSHA Approval.

PUMP DESIGN CONFIGURATION (Wet pit installation)
The pump shall be supplied with a mating cast iron 4 inch discharge connection and be capable of delivering 150 GPM at 12 FT. TDH. The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor. Each pump shall be fitted with lifting chain or stainless steel cable. The working load of the lifting system shall be 50% greater than the pump unit weight.

PUMP CONSTRUCTION
Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. The lifting handle shall be of stainless steel. All exposed nuts or bolts shall be AISI type 316 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

Sealing design shall incorporate **metal-to-metal contact** between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or optional Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.

Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

COOLING SYSTEM
Motors are sufficiently cooled by the surrounding environment or pumped media. A water cooling jacket is not required.

CABLE ENTRY SEAL
The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal.

MOTOR
The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with

moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31.The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of no less than 30 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The motor and the pump shall be produced by the same manufacturer.

The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.
The motor shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

Optional - Shielded Power Cable:
The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The power cable shall be of a shielded design in which an overall tinned copper shield is included and each individual phase conductor is shielded with an aluminum coated foil wrap. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
This cable is required for use with Flygt SmartRun™ intelligent controls.

BEARINGS
The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. **Single row lower bearings are not acceptable.** The minimum L_{10} bearing life shall be 50,000 hours at any usable portion of the pump curve.

MECHANICAL SEAL
Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion and abrasion resistant **tungsten-carbide** ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain

one stationary and one positively driven rotating, corrosion and abrasion resistant tungsten-carbide seal ring.

Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor **depend on direction of rotation for sealing**. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For special applications, other seal face materials shall be available.

The following seal types shall not be considered acceptable or equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. **The motor shall be able to operate dry without damage while pumping under load**.

Where a seal cavity is present in the seal chamber, the area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.

Seal lubricant shall be non-hazardous.

PUMP SHAFT
Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The pump shaft shall be stainless steel – ASTM A479 S43100-T.

If a shaft material of lower quality than stainless steel – ASTM A479 S43100-T is used, a shaft sleeve of stainless steel – ASTM A479 S43100-T is used to protect the shaft material. However, shaft sleeves only protect the shaft around the lower mechanical seal. No protection is provided in the lubricant housing and above. Therefore, the use of stainless steel sleeves will not be considered equal to stainless steel shafts.

IMPELLER (Adaptive)
The impeller shall be of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron), dynamically balanced, semi-open, multi-vane, back-swept, non-clog design. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on a replaceable insert ring.

The impeller shall have vanes hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in waste water. The screw shape of the impeller inlet shall provide an inducing effect for the handling of sludge and rag-laden wastewater. The impeller shall be capable of momentarily moving axially upwards a distance of 15mm/0.6-in. to allow larger debris to pass through and immediately return to normal operating position.

VOLUTE / SUCTION COVER

The pump volute shall be a single piece grey cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable suction cover insert ring in which are cast spiral-shaped, sharp-edged groove(s). The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed. The insert ring shall be cast of Hard-Iron™ (ASTM A-532 (Alloy III A) 25% chrome cast iron) and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

PROTECTION

All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.

A leakage sensor shall be available as an option to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will stop the motor and send an alarm both local and/or remote. **USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS AND TRIP TEMPERATURE ABOVE 125°C (260°F) SHALL NOT BE ALLOWED.**

The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS shall be designed to be mounted in any control panel.

Note: FLS not available in NZ Configurations.

Material selection for wastewater pumps: Raise performance and extend system lifetime

Wastewater can sometimes be both corrosive and abrasive. Selecting the most suitable material for wastewater pumps is therefore crucial to obtaining a reliable, long-lasting and cost-effective operation. This paper provides recommendations for suitable wastewater pump materials and protection for use with different media. It also describes various phenomena associated with corrosion and abrasion.

Background

The increasing complexities in the composition of wastewater are growing. This has made it important to select a pump in the correct material with suitable protection.

The reason for the increased complexity differs depending on geographical area; a few causes are discussed below:

Due to increased labor costs, customers want maintenance-free pump stations. It is therefore more cost-effective to allow the pumps to transport sand over great distances within the system than it is to use vacuum trucks to remove the sand and grit frequently throughout the wastewater network and transport it for disposal.

In some geographical areas, the amount of runoff from streets in cities and towns has increased due to the higher proportion of paved areas. This increase in paved areas contributes to more sand in the system, which in turn leads to a higher degree of abrasive wear on the hydraulic parts of the pumps.

As a result, higher demands are placed on the selection of material as well as the protection of the pump to ensure optimal long-term performance that provides a longer lifetime as well as a sustained high efficiency. This ultimately leads to greater energy savings and a lower total cost of ownership.

It is equally important to understand when it is possible and suitable to use a pump in standard grey iron materials without extra protective measures. In most wastewater applications this is the recommended solution, while other material choices or extra protection will only increase the cost.

Hydraulic parts of a wastewater pump, available in a wide range of material options.

How wastewater influences pump lifetime
There are several different types of wastewater. Depending on the sewage type, the use of different materials is required in order to extend the life of the pump. Chloride content, pH value, temperature, oxygen content and abrasives are factors that affect the selection of material and protection.

Untreated wastewater does not normally contain dissolved oxygen because the microorganisms use the oxygen to consume the organic material present in the wastewater. If oxygen is present, even in low quantities, unacceptably high levels of corrosion may occur if grey iron and carbon steel are used.

The chloride content in wastewater may vary from anywhere between 10 and 500 mg/l; in some cases, however, it can be higher due to seawater infiltration. As a comparison, the chloride level in the Atlantic Ocean is 19500 mg/l.

The pH value in wastewater typically lies around 7.

In untreated wastewater, abrasive particles are often present; this increases the risk of wear on the hydraulic parts. Material corrosion and wear can cause unplanned breakdowns and operational stops and reduce the useful lifetime of the pump.

Example of a typical wastewater station with propeller pumps.

Impeller after an accelerated wear test in a laboratory.

Wear

Wear is, by definition, the loss of material from a surface. Generally speaking, more than a single wear mechanism might occur at the same time; however, one of the wear mechanisms usually has a dominant effect. Wear due to abrasive particles is common in wastewater. If the velocity in the pump volute is high, water-erosion is accelerated. Pump parts, such as impellers, propellers, suction covers and volutes, that are in direct contact with the pumped media are primarily subject to erosive wear. Wear is not linear proportional to the velocity of the pumped media. For metallic material, the wear is normally proportional to more than the square of the velocity. Tests indicate that an exponent of 2.4 is appropriate (Wear $=c*V^{2.4}$). In other words, if the velocity increases by 50%, the wear increases 2.6 times.

There is a strong linear relationship between wear resistance and the hardness of the same type of metallic materials (Figure 1). These wear resistance tests have been conducted at the Xylem material laboratory using a specially designed test apparatus, which simulates the actual conditions inside the pump.

Hard-Iron™ has an extremely high wear resistance due to its embedded hard chromium carbides.

Relative wear resistance test in slurry with 20% natural granite sand (Grain size: 0.70 mm)

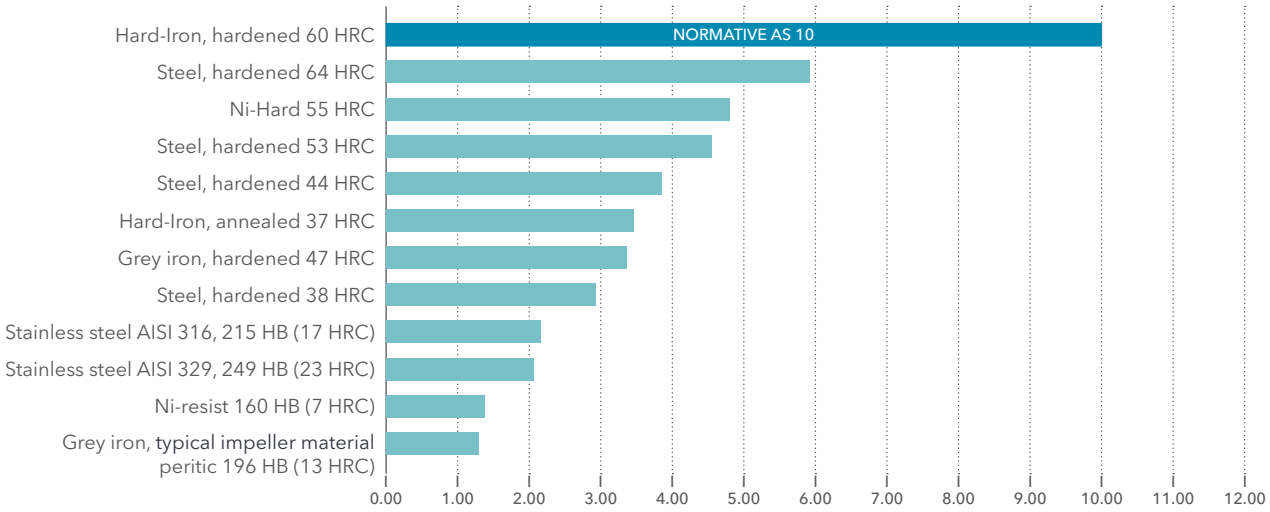


Figure 1: An overview of relative wear resistance of various materials. The graph shows the strong linear relationship between wear resistance and the hardness within the same type of metallic material. This can clearly be seen for steel in different hardness.

The linear relationship between hardness and wear resistance can most clearly be seen with hardened steel. Although these types of steels are made using the same technique and share a common structure, the hardness differs. Grey iron with embedded soft graphite in the structure has a lower wear resistance in the hardened state and in the as-cast state compared to carbon steel with similar hardness. Stainless steel, on the other hand, performs somewhat better than grey iron due to the higher corrosion-resistance properties of stainless steel.

Types of corrosion

There are numerous types of corrosion phenomena, but general corrosion and erosion-corrosion are the most common for grey iron and carbon steel that come into direct contact with wastewater. Galvanic corrosion is another type commonly associated with aluminum pumps; however, the risk of galvanic corrosion is also significant, for instance, when using stainless steel impellers in wastewater.

General corrosion

General corrosion attacks all types of surfaces but usually occurs at low rates. General corrosion is usually not a problem for components that are cast with thick walls, which protect the function of the pump.

The corrosion rate for oxygen-induced corrosion may be accelerated for many reasons, including high temperature, media with high or low pH values, high oxygen content, or high chloride content.

The most common of these accelerating effects is chloride content. As a rule of thumb, if the chloride level is below 200 mg/l, no additional protective measures are necessary for grey iron and carbon steel.

The effects of general corrosion on a wastewater pump that is still functioning after 50 years of use.

Erosion-corrosion

When water flows at high velocities and oxygen erodes the corrosion products from the surface, erosion-corrosion is common. Generally localized to areas with turbulent flow, the attacks are even more severe when gas bubbles and solid particles are present.

Erosion-corrosion damage can be mistaken for cavitation damage. Cavitation can occur if the pump is not working in the correct area of the QH curve or doesn't have enough NPSH. For a correctly applied pump, the risk of cavitation is low. In such cases erosion-corrosion is most likely the cause of damage to the material.

Galvanic corrosion

When two different metals are electrically connected and placed into contact with wastewater that contains chlorides, they form a galvanic cell where the more noble material is cathodic and the less noble anodic. The anodic material is then subject to corrosion.

The rate of corrosion depends upon the:

- Surface area ratio of the cathode to the anode. A bigger anode area compared to the cathode area reduces galvanic effects.
- Magnitude of potential difference (Figure 2). A larger potential difference increases the corrosion rate.
- Conductivity of the liquid. Higher chloride content leads to a higher corrosion rate.

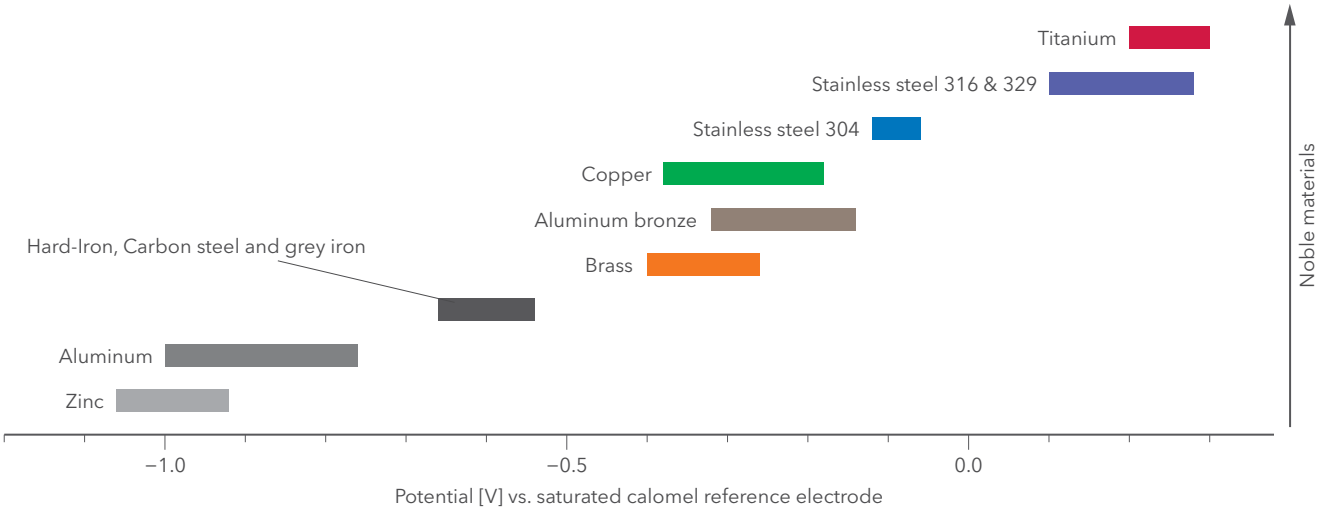


Figure 2: The electropotential of metals can be measured in different water solutions and listed in galvanic series.

Erosion-corrosion of an impeller.

Effects of galvanic corrosion on a lifting bolt with stainless steel chain.

Types of materials

The choice of pump material primarily depends upon the application, and the selection is very important to achieving long pump lifetime. The material in the impeller is the most important factor because the impeller is heavily affected by wear and erosion-corrosion due to its high velocity relative to the liquid.

Frequently used pump materials

Material	Nickel	Chrome	Hardness (hardened state)	Hardness (not hardened state)	Relative wear resistance	Electro-chemical potential	pH limitations	Chloride limitations (Without Zinc anode protection)
Grey iron	0	0%	47 HRC	13 HRC	1.3 (3.3*) *hardened	–0.55 to –0.65	5.5–14	<200 ppm
Stainless steel 316/329	4–11%	17–25%	–	10–20 HRC	2	0.1–0.3	0–14	<500 ppm
Hard-Iron	0	25%	60 HRC	37 HRC	10	–0.55 to –0.65	5–14	200–300 ppm

Figure 3: The most frequently used pump materials along with their respective wear-resistance and corrosion-resistance properties.

Grey iron

Known for its excellent casting properties, grey iron can also be hardened and demonstrates good machining properties. Grey iron is the most common impeller material suitable for most municipal wastewater applications where no special requirements for corrosion protection or wear resistance exist.

Grey iron can be used with wastewater in the pH range of 5.5 to 14 on the condition that the chloride content does not exceed 200 mg/l. If the chloride content exceeds the maximum allowable values, then both the use of zinc anodes and a special epoxy coating is recommended.

Stainless steel

Stainless steel (material type 316/329) demonstrates high resistance towards corrosion, yet has a low wear resistance. Wastewater can at times contain abrasive particles, which limits the suitability of stainless steel in wastewater applications.

If a stainless steel impeller is requested by the customer as preferred material, it is possible to use instead of grey iron; this will, however, have negative effects. If zinc anodes are required because of corrosive media, the anodes will be consumed faster and will need replacement more often than compared to using a grey iron impeller.

Changing a grey iron impeller to a stainless steel impeller also poses the risk of galvanic corrosion. This increases the corrosion potential on the other wetted pump components and surroundings made of less noble materials. Stainless steel is therefore not generally the recommended material in wastewater applications.

Hard-Iron™

Hard-Iron has medium corrosion-resistant and very good wear-resistant properties. Wear tests show that the lifetime of an impeller made of Hard-Iron can be more than three times longer than an impeller made of hardened grey iron.

Hard-Iron is a high-strength cast iron alloy composed of 25% chromium and 3% carbon. During the solidification process, the chromium and carbon transform into very hard carbides. This makes Hard-Iron highly resistant to abrasive wear and erosion-corrosion.

Hard-Iron is more suitable for use in typical wastewater applications than stainless steel. Stainless steel will cause galvanic corrosion of the surrounding materials and reduce the total lifetime of the system.

Accelerated wear tests with sand have been conducted at the Xylem laboratory. Before the tests, the clearance between the impeller and the pump volute measured 0.3 mm. The test results show that impeller wear of stainless steel and grey iron occurs at approximately the same rate. After 50 – 63 hours of accelerated testing, the impeller clearance was measured at 2 mm (Figure 4). An impeller made of Hard-Iron lasts approximately three times longer; after 190 hours of accelerated testing, wear widened the impeller clearance to 2 mm.

Accelerated wear test

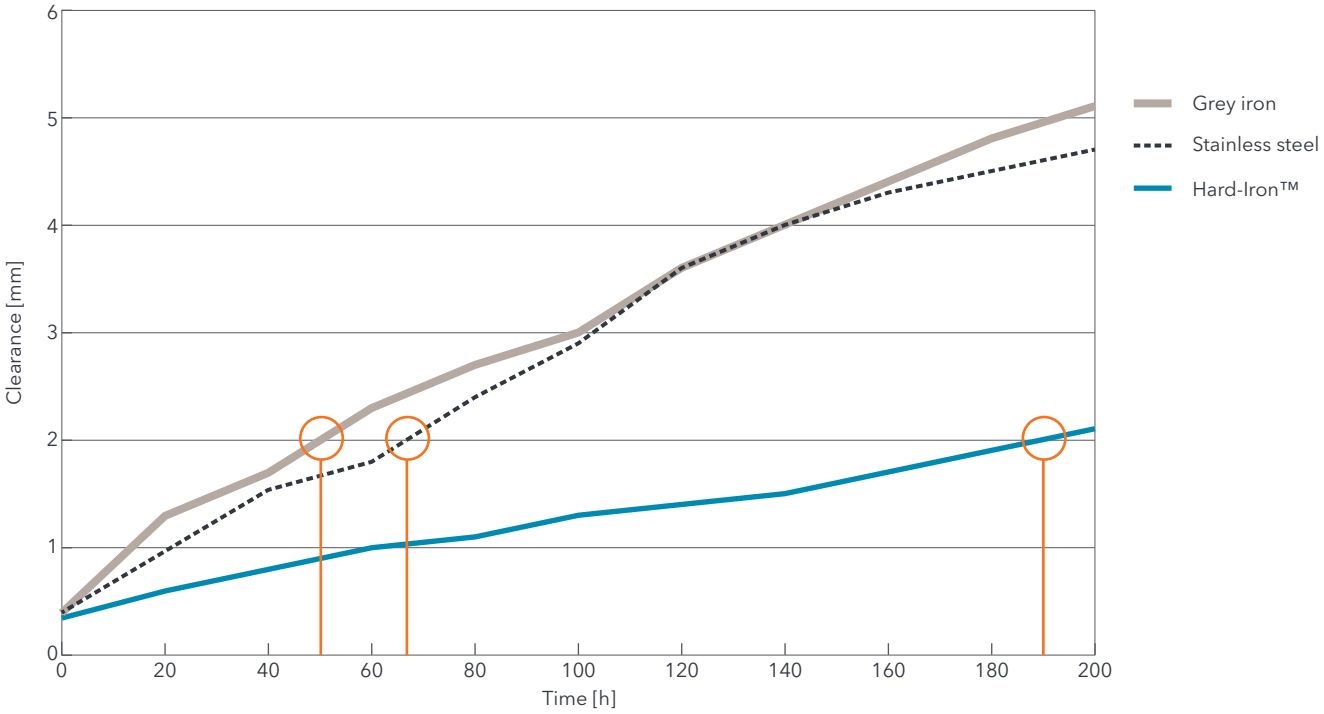


Figure 4: The tests above shows the comparison of material wear. The use of Hard-Iron minimizes wear on pump impellers and prolongs impeller lifetime.

Conclusion

The increasingly complex mixtures of wastewater affect the pump and result in both corrosion and wear in tougher applications. This places higher demands on selecting the right material for the impeller as well as providing proper pump protection such as zinc anodes and protective coatings. As previously mentioned, the choice of material for the pump depends upon the amount of chloride ions and abrasive particles in the pumped media.

The most common wastewater application has conditions of low wear with low amounts of corrosives. Here grey iron as impeller material is the best solution and no extra protection is needed. For high wear conditions, a Hard-iron impeller is necessary, since it increases the wear resistance three times and will give a long lasting operation. If a high amount of chlorides exists, protection by zinc anodes and special epoxy painting is needed, regardless of impeller material. If a stainless steel impeller is specified, it can be used instead of grey iron, but the risk for galvanic corrosion increases. Stainless steel is therefore not our general recommendation for impeller material in wastewater applications.

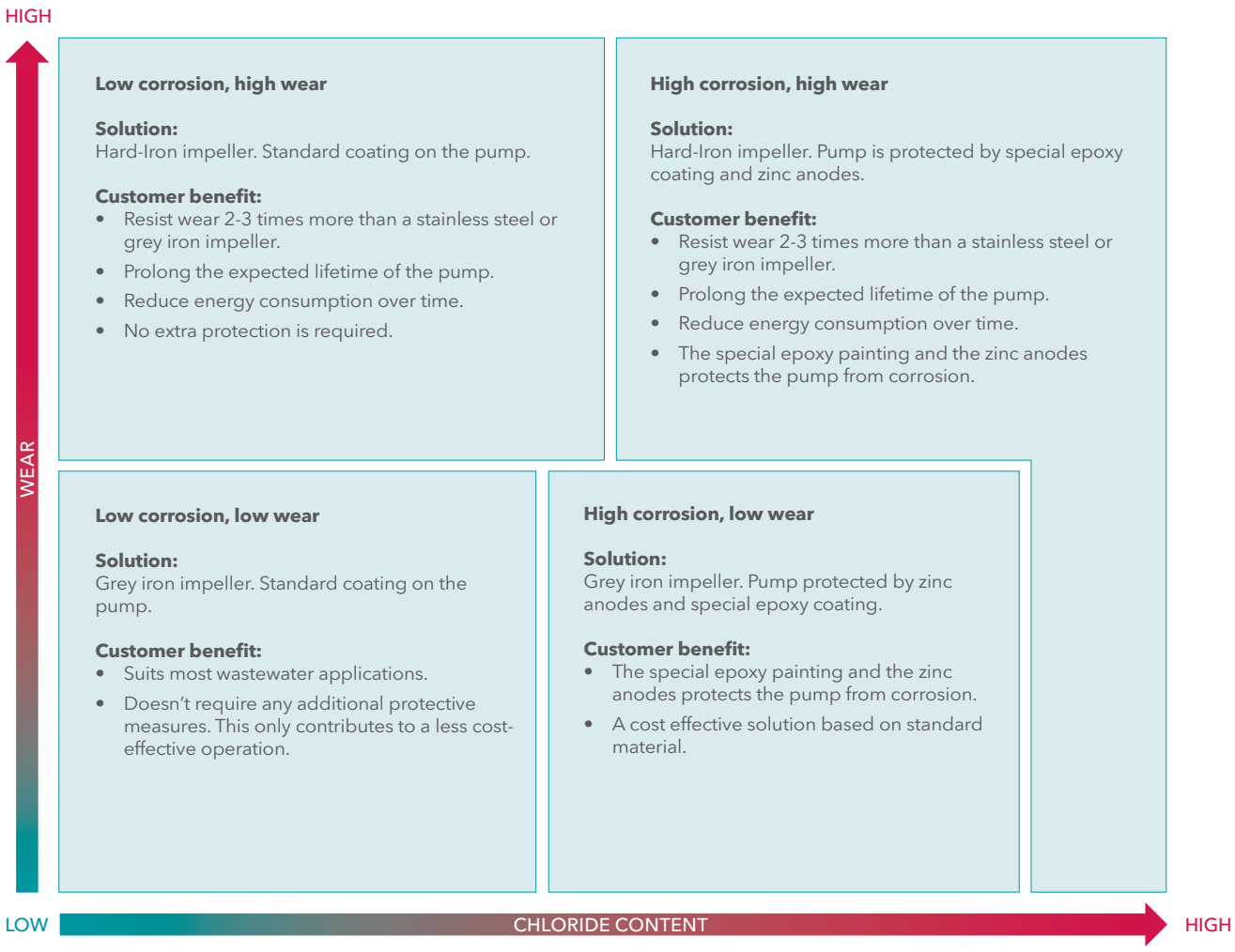


Figure 5: This graph shows recommended impeller materials for grey iron pumps. Other materials may be available but are not recommended for wastewater applications.

Xylem |'zīl m|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're 12,000 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

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The Flygt Clog Free Guarantee

FLYGT PUMPS EQUIPPED WITH N-TECHNOLOGY ARE GUARANTEED TO BE CLOG FREE

Flygt guarantees that its solids-handling pumps, when equipped with impellers utilizing the self-cleaning N-technology, will be free from clogging for 12 months when pumping sewage and wastewater containing solids and debris normally found in domestic wastewater.

Flygt's patented N-technology, now with revolutionary Adaptive N-technology, ensures continuous, trouble free pumping while delivering sustained efficiency regardless of the wastewater challenges, handling stringy fibrous materials and modern trash.

Flygt brand solids-handling pumps equipped with N-technology are guaranteed to operate clog free for 12 months. It's our Clog Free Operations Guarantee.

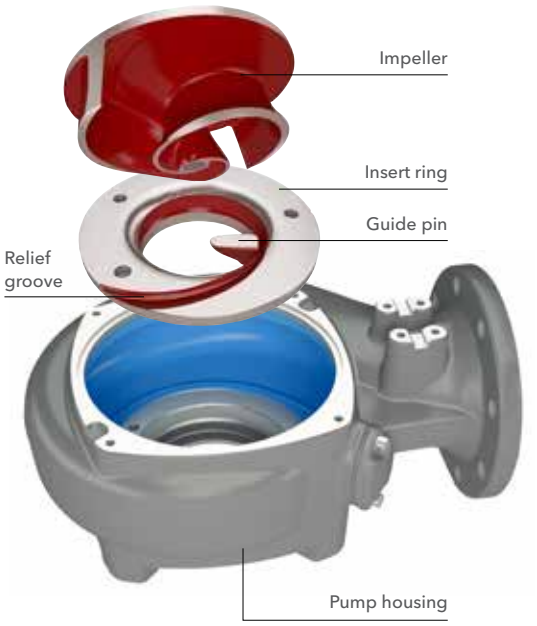
Contact your authorized Flygt representative for details.

FLYGT
a xylem brand

Clog Free Guarantee

The guarantee is extended to the original owner of the pumps for a period of 12 months from the date of start-up of the equipment by the local authorized Flygt representative or distributor.

Should the Flygt N-Pump Impeller clog with typical solids and/or debris normally found in domestic wastewater during this period, an authorized representative will reimburse the owner for reasonable cost to remove the pump, clear the obstruction and reinstall the affected pump unit.



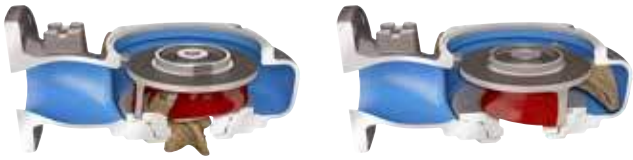
25% Energy Savings Guarantee

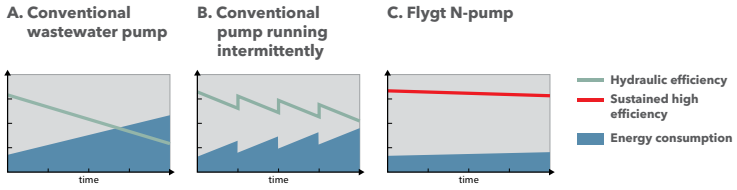
Replace a competitor's non-clog, solids handling pump with a Flygt N-Pump and you will use a minimum of 25% less energy for pumping. We guarantee it.

This guarantee applies to all retrofit applications (lift stations and treatment plants) with solids-bearing liquids. If you do not see at least 25% in pump energy savings, we will refund the difference between the actual pump energy savings and the expected 25% savings for a 3-year period of operation.

The self-cleaning concept

All Flygt N-pumps have the same self-cleaning performance regardless of duty point.



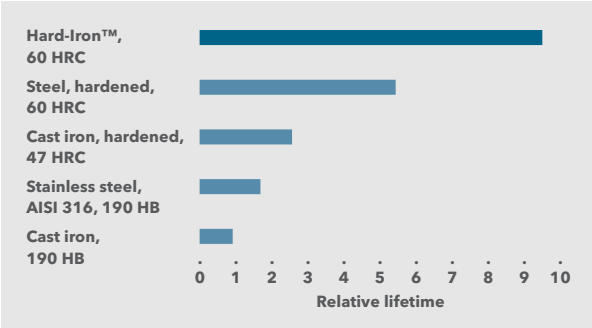


Flygt Hard Iron Advantage

Less erosion, less maintenance.

Hard-Iron (60HRC) is suitable for the toughest wastewater applications with abrasives. In accelerated wear tests, the lifetime of a Hard Iron impeller was more than three times longer than an impeller made of hardened cast iron. Choosing Hard Iron reduces time and money spent on maintenance.

Contact your local Flygt representative for details.



xylem
Let's Solve Water

Flygt is a brand of Xylem, whose 12,000 employees are addressing the most complex issues in the global water market.

www.xyleminc.com

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