संयुक्त समिति प्रतिवेदन (विस्तृत एवं वर्णनात्मक)
माननीय राष्ट्रीय हरित अधिकरण (केन्द्रीय क्षेत्र), भोपाल
प्रकरण संख्या: 145/2025 – सत्यनारायण शर्मा बनाम राज्य राजस्थान
आदेश दिनांक: 28.10.2025

1. **समिति का गठन एवं उद्देश्य**

माननीय राष्ट्रीय हरित अधिकरण, केन्द्रीय क्षेत्र, भोपाल द्वारा दिनांक 28.10.2025 को पारित आदेश के अनुपालन में एक संयुक्त समिति गठित की गई। समिति का उद्देश्य निम्नानुसार निर्धारित किया गया:

- राजस्व ग्राम बडाबास (चतुर्भुज), कोटपूतली-बांसूर मार्ग पर स्थित प्रस्तावित सीवरेज ट्रीटमेंट प्लांट (STP) स्थल का स्थलीय निरीक्षण करना,
- स्थल की मौजूदा परिस्थिति, पर्यावरणीय संवेदनशीलता, भूमि उपयोग एवं सामाजिक पहलुओं का तथ्यात्मक मूल्यांकन करना,
- तथा स्थानीय निवासियों की आपत्तियों एवं अभ्यावेदन का सत्यापन एवं अभिलेखीकरण करना।

समिति में निम्न प्रतिनिधियों को सम्मिलित किया गया:

1. जिला कलेक्टर, कोटपूतली-बहरोड़ का प्रतिनिधि
2. सदस्य सचिव, राजस्थान राज्य प्रदूषण नियंत्रण मंडल (RSPCB) का प्रतिनिधि

सदस्य-नामांकन विवरण:

- आरएसपीसीबी की ओर से क्षेत्रीय अधिकारी, आरएसपीसीबी, कोटपूतली-बहरोड़ को प्रभारी अधिकारी (OIC) नियुक्त किया गया। (प्रतिलिपि परिशिष्ट-अ)
- जिला कलेक्टर की ओर से आयुक्त, नगर परिषद, कोटपूतली को समिति सदस्य नामित किया गया। (प्रतिलिपि परिशिष्ट-ब)

2. **स्थल निरीक्षण की तिथि एवं निरीक्षण दल**

संयुक्त समिति ने दिनांक 18.11.2025 को राजस्व ग्राम बडाबास (चतुर्भुज), खसरा संख्या 1418, 1425, 1425/02 प्रस्तावित STP स्थल का विस्तृत निरीक्षण किया।

निरीक्षण के दौरान निम्न अधिकारी उपस्थित थे–

- क्षेत्रीय अधिकारी, आरएसपीसीबी, कोटपूतली-बहरोड़
- आयुक्त, नगर परिषद, कोटपूतली
- अधिशासी अभियंता, नगर परिषद, कोटपूतली

- सहायक अभियंता, पीएचईडी, कोटपूतली

परियोजना कार्यान्वयन एजेंसी एम/एस टेक्नोक्राफ्ट वेंचर्स लिमिटेड के उप परियोजना प्रबंधक भी स्थल पर उपस्थित पाए गए।

परियोजना विवरण (जैसा कि एजेंसी द्वारा प्रस्तुत):

- प्रस्तावित STP क्षमता: 10 MLD
- तकनीक: SBR (Sequencing Batch Reactor)
- परियोजना लागत: ₹25 करोड़
- पाइपलाइन बिछाने का कार्य: स्थल तक पूर्ण

समिति द्वारा निरीक्षण के दौरान स्थल की भौगोलिक स्थिति, वहाँ विद्यमान सरकारी/सामुदायिक संरचनाएँ, निकटवर्ती धार्मिक स्थल, वृक्षारोपण, आवासीय गतिविधियाँ तथा संभावित पर्यावरणीय प्रभावों का विस्तृत अवलोकन किया गया।

3. **निरीक्षण के दौरान प्राप्त विस्तृत अवलोकन**

3.1 प्रस्तावित स्थल का भौगोलिक एवं भौतिक स्वरूप

स्थल मुख्य सड़क (कोटपूतली-बांसूर मार्ग) से सटा हुआ बहुउपयोगी सरकारी एवं सामुदायिक भू-भाग है, जिसका वर्तमान उपयोग–

- सरकारी भवन एवं जल आपूर्ति संरचनाएँ,
- पीएचईडी पंपिंग स्टेशन,
- ग्रामीण वृक्षारोपण क्षेत्र,
- तथा सामान्य आवागमन मार्ग के रूप में किया जा रहा है।

3.2 सरकारी इमारतें एवं सार्वजनिक जल अवसंरचना

(a) पुलिस चौकी

स्थल के समीप पीएचईडी भवन में एक सक्रिय पुलिस चौकी संचालित पाई गई, जो स्थानीय कानून-व्यवस्था के लिए महत्वपूर्ण है।

(b) PHED पंपिंग स्टेशन एवं जल संरचना

निरीक्षण में अत्यंत महत्वपूर्ण जलापूर्ति ढाँचा पाया गया:

- पंप ऑपरेटर श्री शक्ति सिंह (मो. 9636478525) ड्यूटी पर उपस्थित मिले।
- उनके अनुसार कोटपूतली शहर हेतु सुबह-शाम 1-1 घंटे जल आपूर्ति इसी पंपिंग स्टेशन से की जाती है।
- परिसर के समीप दो प्रमुख जल भंडारण संरचनाएँ मौजूद हैं–

- 400 KL क्षमता का Clear Water Reservoir (CWR)
- 200 KL क्षमता का Overhead Service Reservoir (OHSR)

- स्थल के आसपास PHED के कुल 10 बोरवेल संचालित पाए गए, जो कच्चे जल की नियमित आपूर्ति हेतु हैं।

3.3 **परिसर में स्थित परित्यक्त विद्यालय भवन**

स्थल से सटे एक परित्यक्त सरकारी विद्यालय भवन की संरचना विद्यमान पाई गई।

3.4 स्थानीय निवासियों द्वारा वृक्षारोपण

- लगभग 120–130 पौधे स्थल पर लगाए गए हैं।
- औसत ऊँचाई 5–7 फीट पाई गई।
- ग्रामीणों द्वारा अवगत करवाया कि ये पौधे "हरियालो राजस्थान अभियान" के अंतर्गत लगाए गए थे।
- सुरक्षा हेतु काँटेदार तारबंदी (barbed wire fencing) ग्रामीणों द्वारा की गई है।

3.5 विद्युत लाइन

स्थल के बीच से 33 KV विद्युत लाइन तिरछी दिशा में गुजरती पाई गई है।

3.6 पहुँच मार्ग

स्थल तक दो दिशाओं से सड़क उपलब्ध है, जिससे स्थान आवागमन योग्य है।

4. आसपास स्थित धार्मिक एवं सामुदायिक संरचनाएँ

निरीक्षण के दौरान निम्न संरचनाएँ पाई गईं:

1. गौशाला – लगभग 600 गायों की क्षमता वाली बड़ी गौशाला मुख्य मार्ग के उस पार स्थित है।
2. भगवान चतुर्भुज मंदिर – गौशाला के समीप स्थित प्रमुख धार्मिक स्थल।
3. गडरिया लोहार समुदाय के दो मंदिर –
   - एक मंदिर प्रस्तावित स्थल के एकदम समीप,
   - दूसरा तिरछी दिशा में सड़क के उस पार स्थित।
4. गडरिया लोहार समुदाय के 7–8 परिवार – अस्थायी आवास के साथ स्थल से बिल्कुल सटे पाए गए।
5. मुख्य आवासीय एवं बाजार क्षेत्र – स्थल से लगभग 100–150 मीटर दूर स्थित है।

5. स्थानीय निवासियों से संवाद एवं उनकी आपत्तियाँ

समिति ने अनेक स्थानीय नागरिकों एवं समुदाय प्रतिनिधियों से बातचीत की, जिनमें प्रमुख–

- श्री विक्रम यादव (8003043753)
- श्री दिलीप यादव (9928579387)
- श्री विक्रम सैन (8619956707)
- श्री अनिश कुमार (8690717474)
- श्री हेमराज गुर्जर (9922971051)
- श्री नंदराम यादव
- श्री अमीचंद धानका, जिला परिषद सदस्य (7757158687)
- श्री रामरत्न दास महाराज, श्री ध्यान जी मंदिर (9784648663)
- श्री चंद्रशेखर शर्मा (8005710040)

स्थानीय निवासियों द्वारा एकमत एवं स्पष्ट विरोध दर्ज किया गया। मुख्य आपत्तियाँ–

1. स्थल के निकट धार्मिक स्थल होने से आस्था पर प्रतिकूल प्रभाव।
2. घनी आबादी में दुर्गंध, मच्छर, ट्रक मूवमेंट आदि से दैनिक जीवन प्रभावित होने की आशंका।
3. विद्यमान पौधारोपण को नष्ट होने का भय।
4. विद्यालय भवन, गौशाला व बोरवेलों के समीप STP स्थापना को अनुचित बताया गया।
5. भू-जल प्रदूषण की गंभीर आशंका व्यक्त की गई।

6. नगर परिषद् का पक्ष –

1. **STP क्षमता:** 10 MLD
2. **प्रौद्योगिकी:** SBR (Sequencing Batch Reactor)
3. **परियोजना लागत:** ₹25 करोड़
4. **सीवरेज नेटवर्क:** कोटपूतली में संपूर्ण नगर में सीवरेज लाइन बिछाई जा चुकी है।
5. **भूमि:** प्रस्तावित भूमि राज्य सरकार की स्वामित्व वाली भूमि है।
6. **DPR एवं डिजाइन:** MNIT, जयपुर द्वारा विधिवत परीक्षण एवं अनुमोदित (प्रतिलिपि परिशिष्ट-स)।
7. **STP स्थापना की आवश्यकता:**
    - कोटपूतली नगर से उत्पन्न होने वाले सीवेज के वैज्ञानिक उपचार हेतु आवश्यक।
    - STP से उपचारित जल ESR एवं अंडरग्राउंड टैंक में संग्रहीत कर **उद्यान, उपकरण सफाई, पाइपलाइन फ्लशिंग** इत्यादि में उपयोग किया जाएगा।

- **किसी भी प्रकार का खुला डिस्चार्ज नहीं होगा।**

8. **PHED संरचना:**
   - Borewell प्रभावित नहीं होंगे, आवश्यकता होने पर स्थानांतरित किये जायेंगे ।
9. **वृक्षारोपण:**
   - ग्रामीणों का वृक्षारोपण यथावत रखा जाएगा।
   - यदि स्थानांतरण आवश्यक हुआ, तो **दोगुने पौधे** अन्य स्थान पर लगाए जाएंगे।
10. **धार्मिक स्थल एवं अन्य भवन:**

- उन्हें किसी प्रकार का नुकसान या व्यवधान नहीं पहुँचेगा।

11. **गौशाला द्वारा NOC:**

- श्री ध्यान जी गो सेवा समिति, ग्राम चतुर्भुज द्वारा दिनांक 17.05.2024 को STP हेतु NOC प्रदान की गई (प्रतिलिपि परिशिष्ट-द)।

12. **STP स्थापना/स्थानांतरण पर वित्तीय और पर्यावरणीय विचार:**

- नगर परिषद्र राजस्थान राज्य प्रदूषण नियंत्रण बोर्ड, से पूर्व स्थापना/संचालन हेतु सम्मति प्राप्त करेगी, उसके बाद ही सीवेज ट्रीटमेंट प्लांट (STP) की स्थापना और संचालन किया जाएगा।
- साथ ही, आदेश में उल्लिखित स्थान, यानी खसरा संख्या 714/660, पर STP को वर्तमान स्थान से स्थानांतरित करने पर राजकोष पर अतिरिक्त वित्तीय बोझ पड़ेगा, जिसका अनुमानित राशि लगभग ₹15–16 करोड़ है।
- यह भी ध्यान देने योग्य है कि उक्त खसरा स्थानीय नदी के जलग्रहण क्षेत्र (कैचमेंट एरिया) में आता है। संबंधित विवरण की प्रति संलग्न-य पर उपलब्ध है।

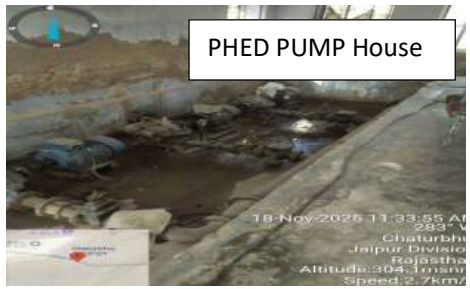
अतः उपरोक्त समस्त अवलोकन एवं निष्कर्ष, माननीय राष्ट्रीय हरित अधिकरण के आदेश दिनांक 28.10.2025 के अनुपालन में प्रस्तुत किए जा रहे हैं।

अधिशाषी अभियंता,
नगर परिषद् कोटपूतली

आयुक्त नगर परिषद्,
कोटपूतली

क्षेत्रीय अधिकारी,
राजस्थान राज्य प्रदूषण नियंत्रण मंडल,
कोटपूतली-बहरोड़

PHED PUMP House



PHED CWR

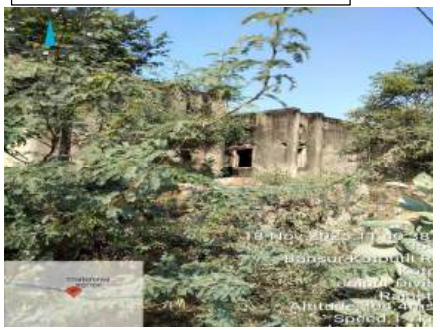
PHED OHSR

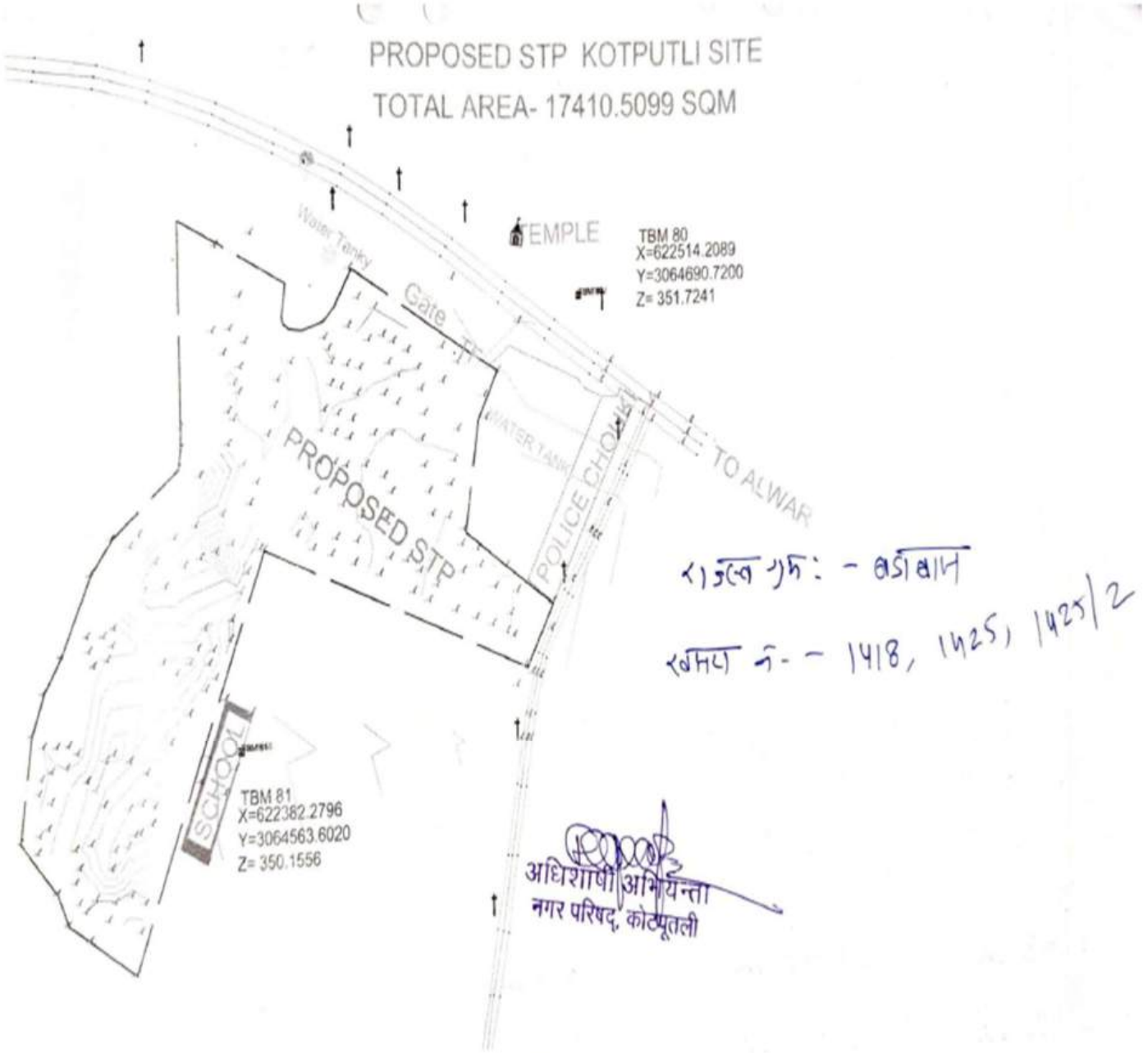
Abandoned Govt. school

Police Chokhi

Gaushala

Abandoned PHED Building

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Y=3064690.7200
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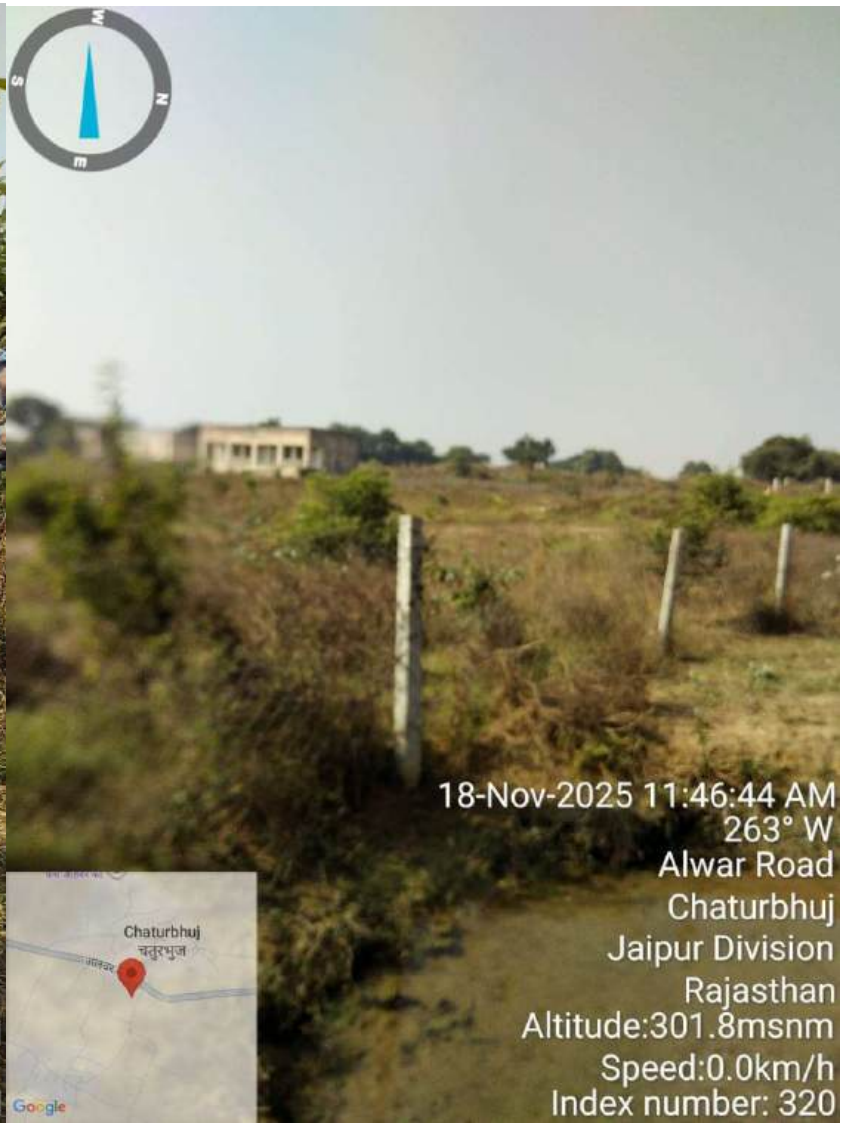
Water Tanky
Gate
WATER TANK
POLICE CHOWK
TO ALWAR
PROPOSED STP
SCHOOL
TBM 81
X=622382.2796
Y=3064563.6020
Z= 350.1556
राजस्व ग्रा: - बड़ाबास
खसरा नं- - 1418, 1425, 1425/2
अधिशाषी अभियन्ता
नगर परिषद, कोटपूतली



Barbered Fencing and Plantation

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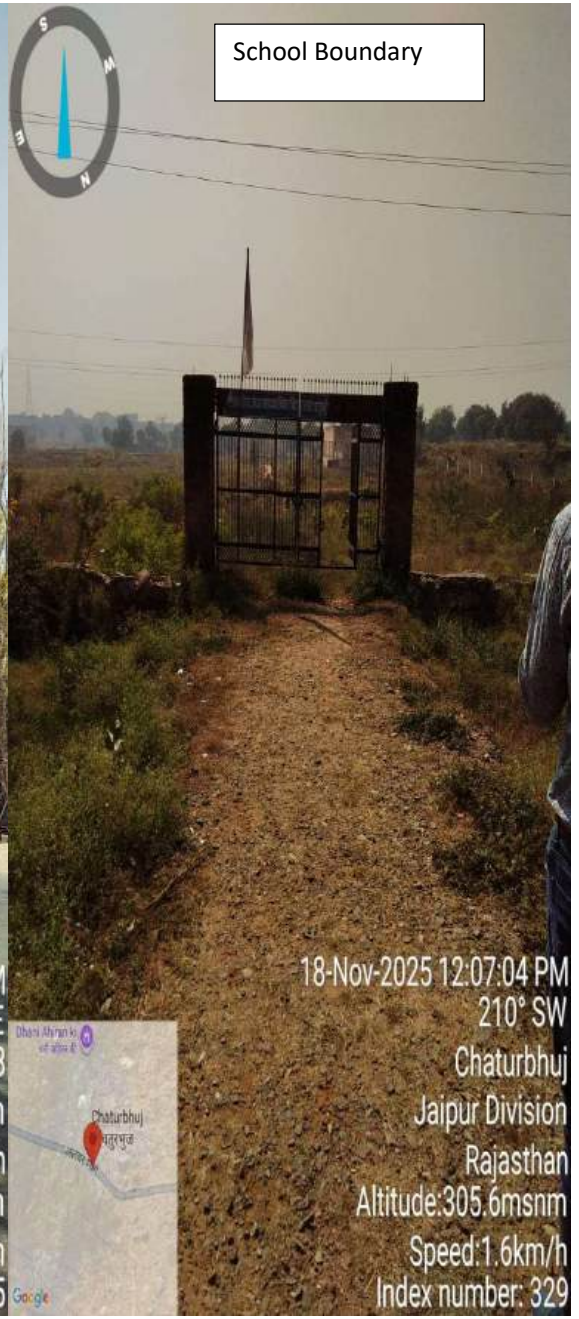
18-Nov-2025 11:52:53 AM
15° N
Bansur-Kotputli Road
Kotputli
Jaipur Division
Rajasthan
Altitude:303.6msnm
Speed:0.0km/h
Index number: 322

Gaushalla
18-Nov-2025 12:04:37 PM
44° NE
Nh48
Jaipur Division
Rajasthan
Altitude:300.2msnm
Speed:0.0km/h
Index number: 325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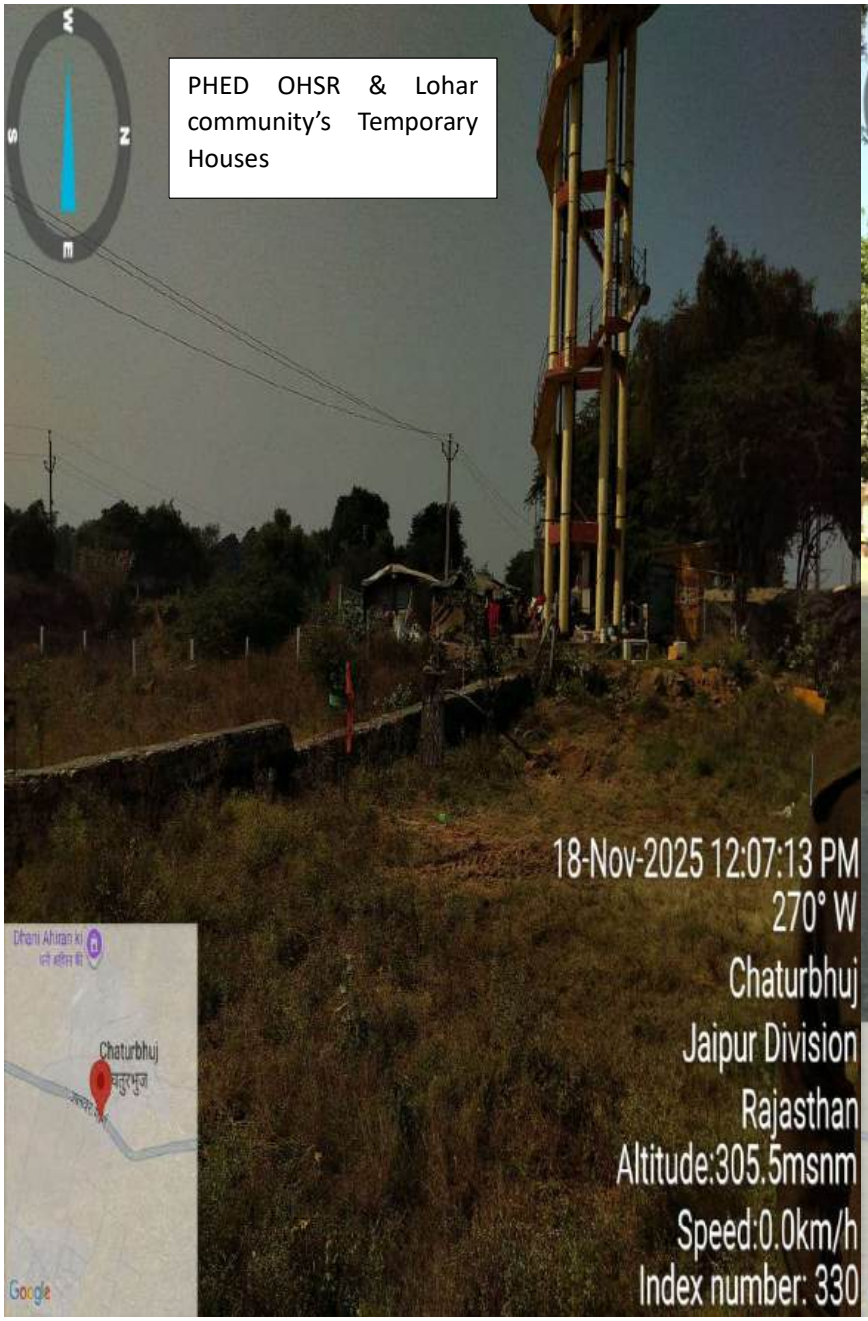
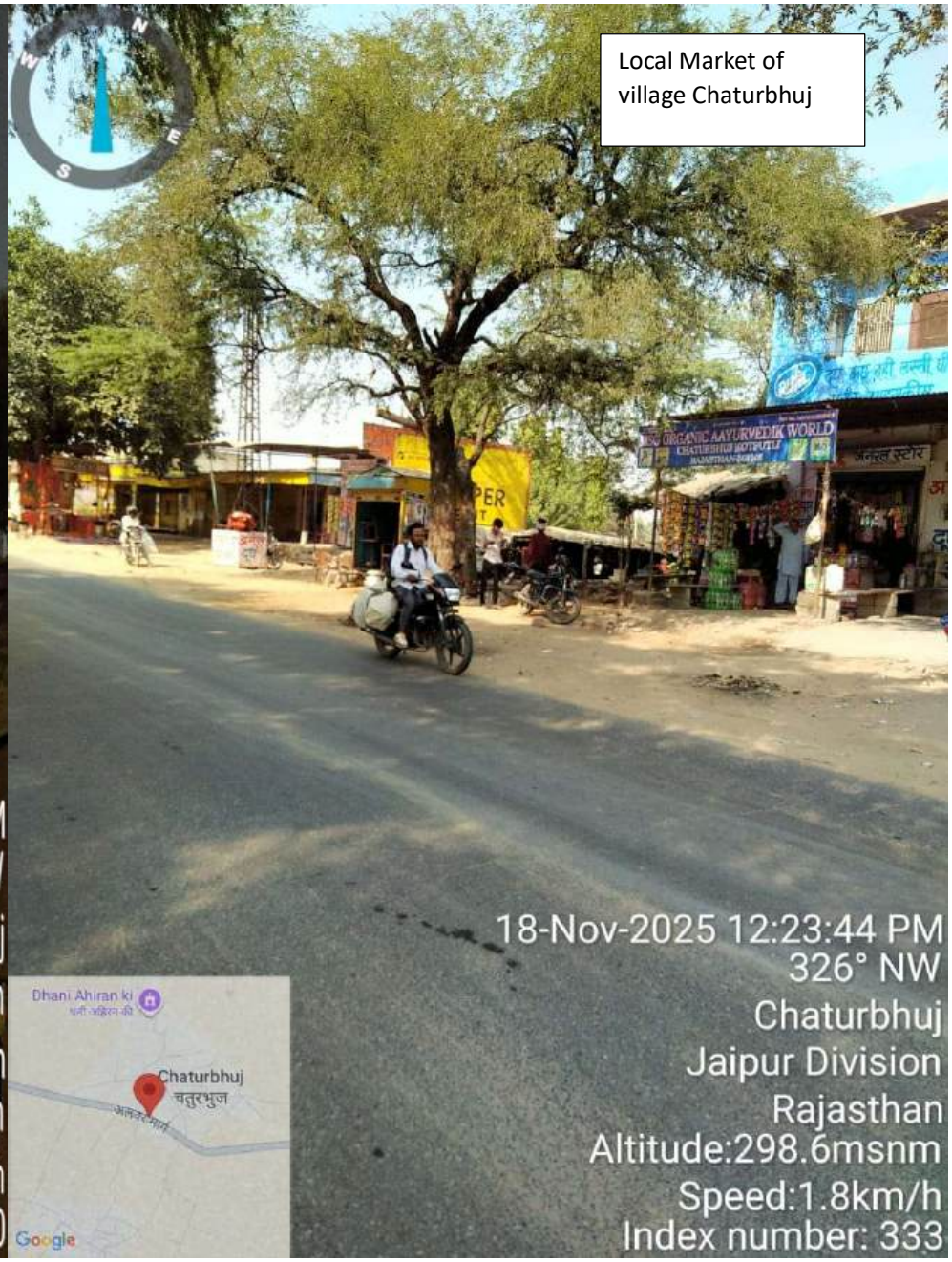
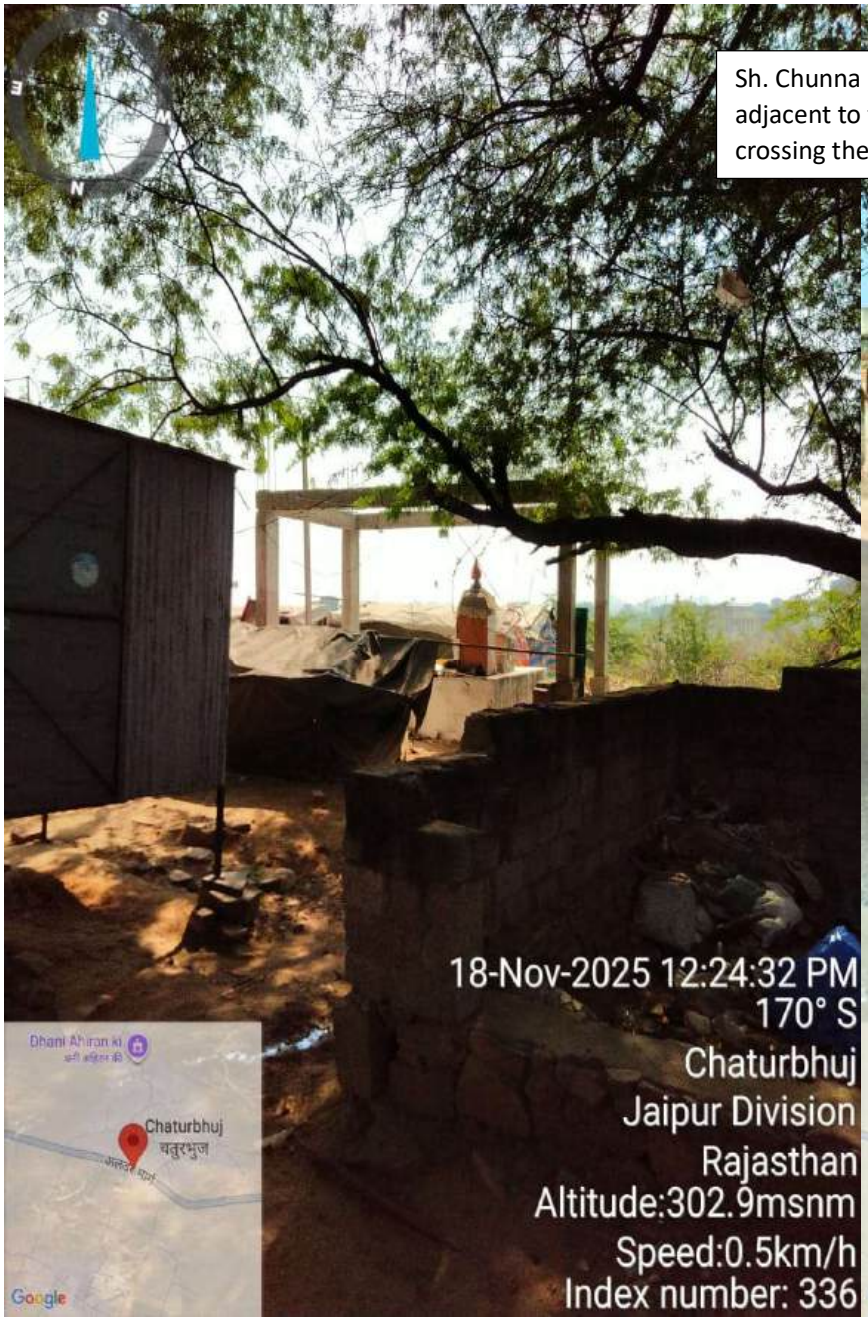
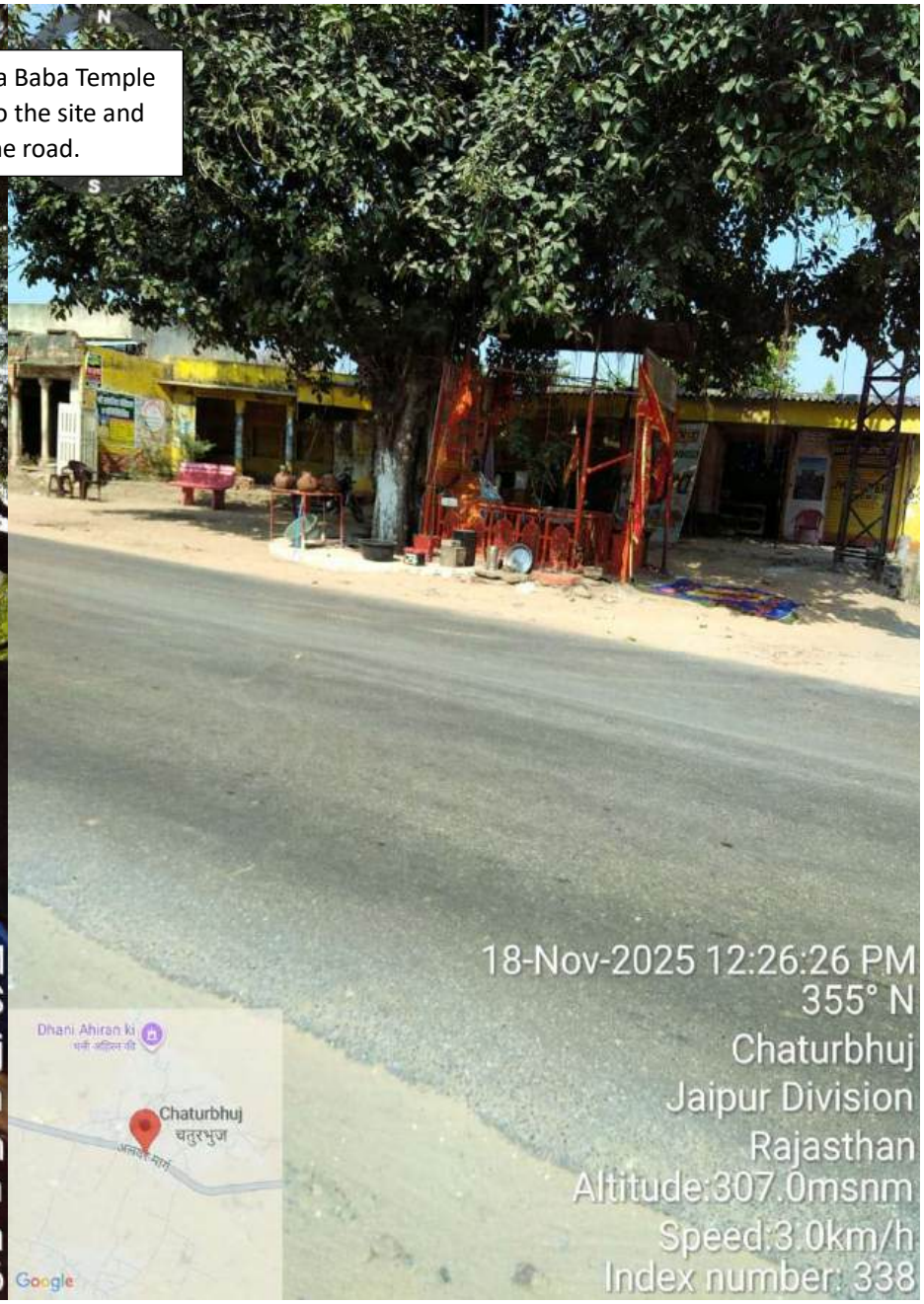
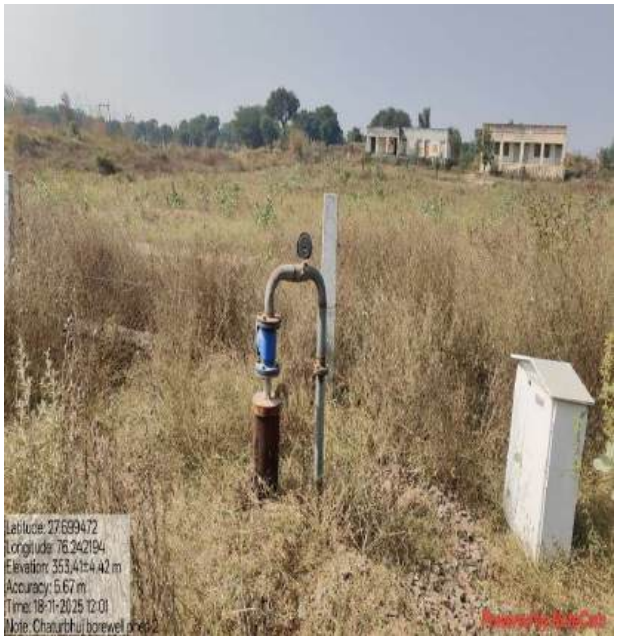
210° SW
Chaturbhuj
Jaipur Division
Rajasthan
Altitude:305.6msnm
Speed:1.6km/h
Index number: 329

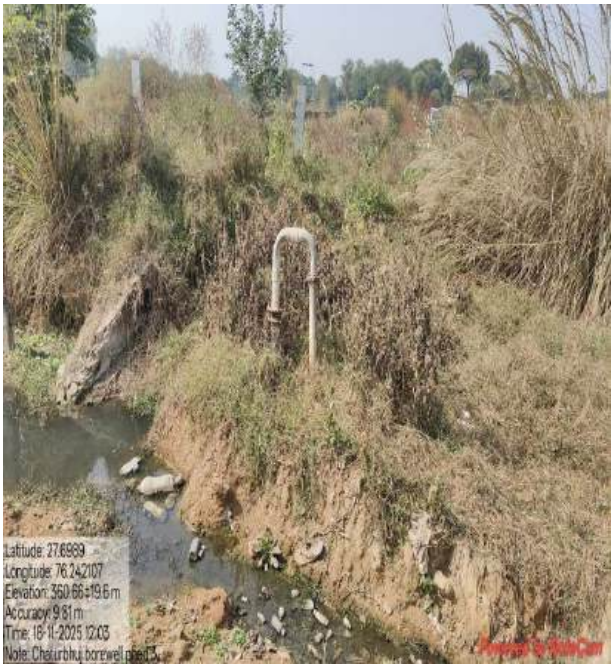

PHED OHSR & Lohar community's Temporary Houses
18-Nov-2025 12:07:13 PM
270° W
Chaturbhuj
Jaipur Division
Rajasthan
Altitude:305.5msnm
Speed:0.0km/h
Index number: 330
Dhani Ahiran ki
Chaturbhuj
चतुरभुज
Google


Local Market of village Chaturbhuj
18-Nov-2025 12:23:44 PM
326° NW
Chaturbhuj
Jaipur Division
Rajasthan
Altitude:298.6msnm
Speed:1.8km/h
Index number: 333
Dhani Ahiran ki
Chaturbhuj
चतुरभुज
Google

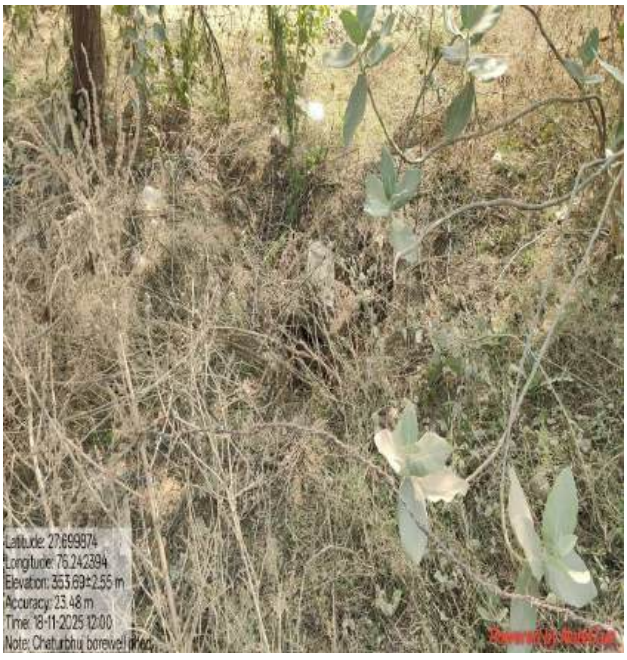

Sh. Chunna Baba Temple adjacent to the site and crossing the road.
18-Nov-2025 12:24:32 PM
170° S
Chaturbhuj
Jaipur Division
Rajasthan
Altitude:302.9msnm
Speed:0.5km/h
Index number: 336
Dhani Ahiran ki
Chaturbhuj
चतुरभुज
Google


18-Nov-2025 12:26:26 PM
355° N
Chaturbhuj
Jaipur Division
Rajasthan
Altitude:307.0msnm
Speed:3.0km/h
Index number: 338
Dhani Ahiran ki
Chaturbhuj
चतुरभुज
Google





PHED Bore wells



PHED Bore wells

PHED Bore wells

Proposed STP site

Government School Boundary

Shri Chaturbhuj Maharaj Mandir

Latitude: 27.700676
Longitude: 76.243
Elevation: 352.76±2.55 m
Accuracy: 4.609 m
Time: 18-11-2025 12:19
Note: Chaturbhuj gaushala
Powered by NoteCam

Gaushaala

PIONEER
45S46

NIKE

Conversation with Local villagers

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संलग्न-अ

RSPCB

यूनिक कोड नं0 W **18-509-17799-407-43-145/2025**

क्रमांक: प- **F.10(793)RPCB/Legal/NGT/2025/** 1134-1135 दिनांक: ~~04~~ 06 **-11-2025**

आदेश

विषय-

i. वाद//याचिका/अपील सं0: **ORIGIONAL APPLICATION/APPLICATION/145/2025**

ii. याची/वादी/अपीलार्थी : **SATYANARAYAN SHARMA**

iii. प्रत्यर्थी/प्रतिवादी: **State of Rajasthan & Ors.**

iv. न्यायालय का नाम: **NATIONAL GREEN TRIBUNAL (NGT), Bhopal**

दीवानी प्रक्रिया संहिता, 1908 -(केन्द्रीय अधिनियम, 5 वर्ष 1908) के आदेश XXVII के नियम 1 एवं 2 / XXIX के नियम 1 के अंतर्गत प्रदत्त शक्तियों का प्रयोग करते हुये महामहिम राज्यपाल महोदय / संस्था की ओर से उक्त प्रकरण में जवाब/अपील/रिट प्रस्तुत करने, अभिवचनों को सत्यापित करने एवं विविध आवेदन पत्र/प्रार्थना पत्र प्रस्तुत करने हेतु निम्न को प्रभारी अधिकारी/समन्वयक नियुक्त किया जाता है :-

प्रभारी अधिकारी/समन्वयक का नाम: **Regional Officer, Kotputli-Behror**
पदनाम: **Regional Officer, Kotputli-Behror**
पता: **Near Laxmi Narayan Durga Mata Temple, NH 48, Neemrana, Kotputli-Behror-301705**
Mobile No / Email : **9829664373 / rorpcb.bkt@gmail.com**

प्रभारी अधिकारी//समन्वयक को यह व्यादिष्ट किया जाता है कि वे राजस्थान विधि एवं विधिक कार्य विभाग नियमावली, 1999 के नियम 233 में उल्लेखित दायित्व एवं कर्त्तव्यों के अतिरिक्त अपनी नियुक्ति के तत्काल पश्चात् निम्न कार्य भी सम्पादित करेंगे:-

1. प्रकरण के तथ्यों के संदर्भ में तत्काल आवश्यक जानकारी एवं आगामी तारीख पेशी ज्ञात करके राजकीय अधिवक्ता से सम्पर्क कर न्यायालय में आवश्यक कार्यवाही सम्पादित करेंगे।
2. प्रकरण की विषयवस्तु से सम्बन्धित सभी पत्रावलियां/दस्तावेज/अधिनियम/नियम// विनियम/परिपत्र /दिशा-निर्देश /अधिसूचना / आदेश /सूचना एवं सुसंगत तथ्य एकत्रित करेंगे।
3. प्रकरण में उठाये गये सभी तथ्य एवं बिन्दुओं का प्रशासनिक अनुभाग से प्राप्त तथ्यात्मक प्रतिवेदन एवं तथ्यों के आधार पर प्रकरण का पैरा क्रमानुसार तथ्यात्मक प्रतिवेदन तैयार करते हुए एवं ऐसी अतिरिक्त जानकारी अंकित करते हुये जो राजकीय अधिवक्ता एवं राज्य पक्ष के प्रतिरक्षण/पक्ष प्रस्तुतिकरण के लिए आवश्यक/सहायक हो, तैयार करेंगे।
4. प्रभारी अधिकारी//समन्वयक सम्बन्धित प्रशासनिक अनुभाग से तथ्य एवं तथ्यात्मक विवरण प्राप्त करके राजकीय अभिभाषक को प्रकरण का ब्रीफ, प्रभारी अधिकारी//समन्वयक के नियुक्ति पत्र के साथ प्रपत्र 'क' में उपलब्ध करायेंगे, जिसमें प्रकरण की पैराक्रमानुसार तथ्यात्मक स्थिति के अतिरिक्त प्रकरण की विषयवस्तु का दिनांकवार विवरण एवं घटनाक्रम अनुसार, सम्बन्धित नियम, अधिनियम, अधिसूचना, परिपत्र एवं दिशा-निर्देश और यदि पूर्व में समान बिन्दुओं पर निर्णित उच्च न्यायालय//उच्चतम न्यायालय के निर्णय हो तो वे (List / Details of Dates and Events, Act, Rules, Notification, Circular, Guidelines etc, Courts Judgments relevant & under reference) भी प्रभारी अधिकारी/समन्वयक द्वारा स्वयं के ज्ञान व विभाग के अभिलेखानुसार ज्ञात कर इस ब्रीफ में सम्मिलित किये जायेंगे।
5. न्यायालय में दायर किये जाने वाले वाद/ अपील/ पुनर्विलोकन/ पुनरीक्षण/विविध प्रार्थना पत्र आदि की विभागीय तथ्यात्मक स्थितियों /आधार एवं तथ्यों का अभिलेख के साथ एकत्रिकरण किया जावें, जिनके आधार पर कार्यवाही सम्पादित की जानी है।
6. प्रभारी अधिकारी/समन्वयक द्वारा प्रकरण की तथ्यात्मक रिपोर्ट प्राप्त हो जाने एवं पैनल लॉयर/स्टैंडिग कॉउन्सिल/राजकीय अधिवक्ता/एडवोकेट ऑन रिकार्ड/अतिरिक्त महाधिवक्ता की प्रकरण में पैरवी हेतु नियुक्ति हो जाने पर संबंधित अधिवक्ता से अतिशीघ्र सम्पर्क करके वांछित कार्यवाही सम्पादित की जावे।
7. प्रभारी अधिकारी/समन्वयक प्रकरण के सुसंगत, क्रमबद्ध एवं व्यवस्थित तथ्यों व अभिलेख के साथ यथा समय पूर्व राजकीय अधिवक्ता से सम्पर्क करके आवश्यक प्रार्थना पत्र जवाब/अपील/रिट आदि तैयार न्यायालय में प्रस्तुत करायेंगे।
8. प्रभारी अधिकारी//समन्वयक द्वारा उपर्युक्त तथ्यात्मक प्रतिवेदन एवं सामग्री के साथ प्रभारी अधिकारी द्वारा राजकीय अधिवक्ता से व्यक्तिशः सम्पर्क करके लिखित कथन/प्रत्युत्तर/अपील/ पुनर्विलोकन/ पुनरीक्षण/रिट याचिका/प्रार्थना पत्र आदि तैयार करवाया जावेगा और प्रारूपित दस्तावेज पर स्वयं एवं राजकीय अधिवक्ता के हस्ताक्षर करवाकर तथ्यों का सत्यापन/ प्रमाणीकरण/ अनुमोदन विधिक्षा हेतु प्रशासनिक अनुभाग को प्रस्तुत किया जावेगा।
9. प्रभारी अधिकारी/समन्वयक न्यायालय में पैरवी कर रहे राजकीय अधिवक्ता के पास प्रकरण पत्रावली परिपूर्ण एवं नवीनतम प्रगति व सूचनाओं सहित उपलब्ध रहे, यह सुनिश्चित करेंगे।
10. प्रभारी अधिकारी/समन्वयक प्रकरण में न्यायालय में निर्धारित की गई सुनवाई की तारीख, प्रकरण की प्रगति एवं उसमें सम्पादित होने वाली आगामी कार्यवाही से स्वयं एवं विभाग को सदैव अवगत रखेंगे।
11. प्रभारी अधिकारी//समन्वयक प्रत्येक तारीख पेशी को न्यायालय में उपस्थित [illegible] करेंगे और समय पर साक्ष्य, अभिलेख एवं प्रकरण की वर्तमान नवीनतम प्रगति प्रशासनिक अनुभाग/[illegible] कार्यालय// अधिकारी से ज्ञात करके न्यायालय में प्रस्तुत करवायेंगे। अतः प्रभारी अधिकारी [illegible] प्रगति निरन्तर प्राप्त करते रहेंगे।
12. प्रभारी अधिकारी//समन्वयक प्रत्येक तारीख पेशी की कार्यवाही एवं [illegible] कर विभाग को अवगत करायेंगे और LITES के प्रपत्र 3 में [illegible]
13. प्रभारी अधिकारी/समन्वयक द्वारा न्यायालय से कोई आदेश, निर्देश, निर्णय [illegible] उसके तथ्यों सहित उसी दिन जानकारी/सूचना उच्चाधिकारी को देनी होगी। प्रभारी अधिकारी/समन्वयक न्यायालय के उक्त निर्देश/आदेश/निर्णय की प्रमाणित प्रति प्राप्त करने हेतु उसी दिन अथवा अगले दिवस को आवेदन प्रस्तुत करेंगे।

Signature valid
Digitally signed by Shailendra Pratap Singh
Designation: Member Secretary
Date: 2025.11.04 20:07:30 IST
Reason: Approved

Page 1 of 2
18642579

14. प्रभारी अधिकारी//समन्वयक प्रकरण में स्वयं की रिपोर्ट और राजकीय अधिवक्ता की राय के साथ न्यायालय के निर्देश, आदेश, निर्णय की प्रमाणित प्रति न्यायालय से प्राप्त कर तत्काल विभाग को प्रस्तुत करेंगे।
15. प्रभारी अधिकारी/समन्वयक का दायित्व विभाग के विरूद्ध पारित निर्णय के सन्दर्भ में आगामी अपीलीय कार्यवाही में अन्य प्रभारी अधिकारी/समन्वयक की नियुक्ति अथवा निर्णय की अनुपालना होने तक निरन्तर रहेगा।
16. प्रभारी अधिकारी//समन्वयक वादकरण प्रकरणों की मॉनिटरिंग हेतु न्याय विभाग की वेबसाइट LITES के निर्धारित सभी प्रपत्रों का संधारण करेंगे एवं LITES/Updation Center को समय समय पर प्रकरण प्रगति व अद्यतन सूचना प्रस्तुत करेंगे।
17. प्रभारी अधिकारी//समन्वयक का स्थानान्तरण/सेवानिवृत्त होने की स्थिति में अथवा प्रकरण अन्य प्रभारी अधिकारी//समन्वयक को स्थानान्तरित होने पर सभी प्रकरणों की सूची, पत्रावलियां, अभिलेख, आगामी तारीख पेशी और उस पर न्यायालय में सम्पादित होने वाली कार्यवाही का विवरण नवीन प्रभारी अधिकारी//समन्वयक को उपलब्ध करवाया जावेगा और इस आशय को प्रस्तुत करेगा अन्यथा स्थिति में अन्तिम वेतन भुगतान प्रमाण पत्र (L.P.C) जारी नहीं होगा।
18. यदि प्रभारी अधिकारी/समन्वयक उपर्युक्त निर्देशों की उपेक्षा करता है अथवा इनके प्रति असावधान पाया जाता है तो स्वयं को अनुशासनिक कार्यवाही हेतु उत्तरदायी बनायेगा।

(Sharda Pratap Singh)
Member Secretary

क्रमांक: प- F.10(793)RPCB/Legal/NGT/2025/ 1134-1135 दिनांक: ~~04~~ 06-11-2025

प्रतिलिपि निम्न को सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है:-

1. Regional Officer, Regional Office, Rajasthan State Pollution Control Board, Kotputli-Behror, appointed as OIC on behalf of RSPCB with the direction to prepare the parawise factual report, contact the counsel of the State Board and get the draft reply so that same may be filed with approval of competent authority before Hon'ble National Green Tribunal, Bhopal. The OIC is also directed to discharge duties of the Officerln-charge of thecase as prescribed under rule 233 of the Rajasthan Law and Legal Affair Department Manual, 1999.

2. Shri Rohit Sharma, Advocate, E-5/43, Arera Colony, Bhopal, Pin-462016 Mobile No. 8435256569 with the request to file the reply, act and plead before the Hon'ble NGT, Bhopal on behalf of RSPCB. You will be paid fee as per RSPCB office order dated 05.03.2020.

Member Secretary

Signature valid
Digitally signed by Sharda Pratap Singh
Designation : Member Secretary
Date: 2025.11.04 10:07:30 IST
Reason: Approved

RajKaj Ref No.:
18642579

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कार्यालय जिला कलक्टर एवं जिला मजिस्ट्रेट, कोटपूतली–बहरोड

EMAIL-DM.KOTPUTLI.BEHROR.RAJASTHAN@GOV.IN

क्रमांक / राजस्व / एन.जी.टी. / 2025 / 7016 दिनांक:– signed date

–: आदेश :–

माननीय राष्ट्रीय हरित प्राधिकरण भोपाल के प्रकरण संख्या 145 / 2025(CZ) प्रकरण सत्यनारायण शर्मा बनाम राजस्थान सरकार एवं अन्य में पारित आदेश दिनांक 28.10.2025 की पालना में माननीय न्यायालय द्वारा पारित आदेशों के संबंध में आवश्यक जांच हेतु **आयुक्त, नगर परिषद कोटपूतली** को अधोहस्ताक्षरकर्ता का प्रतिनिधि नियुक्त कर निर्देशित किया जाता है कि वह प्रकरण में गहन जांच कर आवश्यक कार्यवाही करते हुये प्रकरण में समस्त पक्षकारों से समन्वय स्थापित कर अधोहस्ताक्षरकर्ता की ओर से जवाब माननीय न्यायालय में प्रस्तुत करवाना सुनिश्चित करेंगें तथा जवाब की एक प्रति अधोहस्ताक्षरकर्ता के समक्ष प्रस्तुत किया जाना सुनिश्चित करेंगें।

संलग्नः–मा0 एन.जी.टी. का आदेश
मय संलग्न दस्तावेज।

(प्रियंका गोस्वामी)
जिला कलक्टर,
कोटपूतली–बहरोड

क्रमांक / राजस्व / एन.जी.टी. / 2025 / 7017 – 7019 दिनांकः–signed date

प्रतिलिपिः–सूचनार्थ, पालनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित हैः–

1. उपखण्ड अधिकारी, कोटपूतली।
2. आयुक्त नगर परिषद, कोटपूतली को पालनार्थ।
3. क्षेत्रीय अधिकारी, राजस्थान राज्य प्रदूषण नियंत्रण मंडल, कोटपूतली–बहरोड़, को आयुक्त, नगर परिषद कोटपूतली से समन्वय स्थापित कर नियमानुसार आवश्यक कार्यवाही हेतु पालनार्थ।

जिला कलक्टर,
कोटपूतली–बहरोड

Signature valid

Digitally signed by Priyanka Goswami
Designation : Collector & District Magistrate
Date: 2025.11.11 15:14:37 IST
Reason: Approved

Annexure-C

संलग्न-स

OFFICE OF THE MUNICIPAL COUNCIL KOTPUTLI

Letter No: NPKTP/2023/ 925 **Date:** 02/07/24

To,
Project Manager,
M/s Technocraft construction Pvt. Ltd.
Address of Contractor: S-550/51, Office No. 214, First Floor, School Block, Shakarpur, Delhi-110092
Email: kotputli.project@technocraftconstruction.com

pe text here

Sub: Providing, laying, jointing, testing and commissioning of sewer system and all ancillary works along with Design, construction, supply, installation, testing and commissioning (Civil, Electrical, Mechanical and Instrumentation and other necessary works) of SPS, MPS and 10 MLD capacity STP based on SBR process with provision of 1 year defect liability and there after 10 years O&M for Kotputli town, Jaipur District, Rajasthan. **Approval of Basic Engineering Package (BEP), Overall Engineering Package, Plant Layout, Piping & Instrumentation Diagram & Hydraulic Flow Diagram of 10 MLD STP at Kotputli.**

Ref.: 1. Mnit letter no. 2598 dated 28/06/2024 Vetting of Basic Engineering Package (BEP), Overall Engineering Package, Plant Layout, Piping & Instrumentation Diagram & Hydraulic Flow Diagram of 10 MLD STP at Kotputli.

Dear Sir,

As per your referred letter of MNIT Jaipur Vetting of Basic Engineering Package (BEP), Overall Engineering Package, Plant Layout, Piping & Instrumentation Diagram & Hydraulic Flow Diagram of 10 MLD STP at Kotputli are reviewed and same attached here with approved copy 1 set of drawing of Cross – Section of Road Restoration for Bitumen Road is released for "**Good for Construction**".

We appreciate your consideration of this request and look forward to your response.

En-closer:- As above

Sr.	Title	Drawing No	Rev.
1	Basic Engineering package (BEP)		R-0
2	Overall Engineering Package		R-0

OFFICE OF THE MUNICIPAL COUNCIL KOTPUTLI

3	Plant Layout	TCPL/MCK/KPL/10 MLD/LAY/01	R-0
4	Piping & Instrumentation Diagram	SFC/A3/D1065/01/01	R-0
5	Piping & Instrumentation Diagram	TCPL - 10 - PR - 01 - 001	R-0
6	Hydraulic Flow Diagram	TCPL - 10 - PR - 03 - 001	R-0

Executive Engineer
Municipal Council Kotputli

Letter no. : NPKTP/2023/ 926- 927 **Date:** 02/07/24

Copy to:

1.) Commissioner, Municipal Council Kotputli
2.) Guard File

Executive Engineer
Municipal Council Kotputli

Malaviya National Institute of Technology, Jaipur- 302017
Civil Engineering Department,

Prof. Y P MATHUR
Mobile 9413941350
yogeshpmathur@gmail.com
ypmathur.ce@mnit.ac.in

MNIT/CIVIL/YPM/CON/TECHNOCRAFT/STP/2024/2598 Date: 28.06.2024

To,
Executive Engineer,
Municipal Council, Kotputli,
Jaipur, Rajasthan
Email: kotputliulb.jaipur@yahoo.com.

Sub: Providing, laying, jointing, testing and commissioning of sewer system and all ancillary works along with Design, construction, supply, installation, testing and commissioning (Civil, Electrical, Mechanical and Instrumentation and other necessary works) of SPS, MPS and 10 MLD capacity STP based on SBR process with provision of 1 year defect liability and there after 10 years O&M for Kotputli town, Jaipur District, Rajasthan. **Vetting of Basic Engineering Package (BEP), Overall Engineering Package, Plant Layout, Piping & Instrumentation Diagram & Hydraulic Flow Diagram of 10 MLD MPS & STP at Kotputli.**

Ref.: 1. your letter no. 605 dated 05/06/2024 Request for Vetting of Basic Engineering Package (BEP), Overall Engineering Package, Plant Layout, Piping & Instrumentation Diagram & Hydraulic Flow Diagram of 10 MLD MPS & STP at Kotputli.

Dear Sir,

With reference to subject mention above, the Basic Engineering Package (BEP), Overall Engineering Package, Plant Layout, Piping & Instrumentation Diagram & Hydraulic Flow Diagram of 10 MLD MPS & STP at Kotputli is reviewed & vetted.

We here by attached vetted following Design & Drawings as detailed hereunder in 02 sets:

S.No.	Description	Drawing No / Rev.
1.	Basic Engineering package (BEP) & Overall Engineering Package	
2.	Plant Layout	TCPL/MCK/KPL/10MLD/LAY/01/ R-0
3.	Hydraulic Flow Diagram	TCPL - 10 - PR- 03 – 001 / R-0
4.	Piping & Instrumentation Diagram	TCPL - 10 - PR- 01 – 001 / R-0 SFC/A3/D1065/01/01/R-0

Thanking you
Y. P. Mathur

(Y.P. MATHUR)
Professor (HAG)
Civil Engineering Department
Malaviya National Institute of Technology
Jaipur

Copy to:
1.) Commissioner, Municipal Council Kotputli
2.) M/s Technocraft Construction Pvt. Ltd

Basic Engineering Package

10 MLD Sewage Treatment Plant at Kotputli

Based on C-Tech SBR Technology

here

End User

Municipal Council Kotputli, Rajasthan

Submitted by

M/s. Technocraft Construction Pvt. Ltd.

29th May, 2024

SFC-A4-D1065-BEP-C-Tech-R0

Technology Provider

SFC Environmental Technologies Pvt Ltd

21st Floor, The Ambience Court, Sector – 19D, Vashi,
Navi Mumbai – 400 705

Technocraft Construction Pvt. Ltd.

INDEX

SR NO.	CONTENTS	PAGE NO.
1.	ABBREVIATIONS	2
2.	INTRODUCTION	3
3.	DESIGN BASIS	4
4.	PROCESS DESCRIPTION	6
5.	PROCESS DESIGN CALCULATIONS	14
6.	DESIGN OUTPUT	31
7.	INSTRUMENTS & CONTROL PHILOSOPHY	32
8.	EQUIPMENT LIST FOR C-TECH SYSTEM	34

(M.P. MATHUR)
Professor (HAG)
Civil Engineering Department
Malaviya National Institute of Technology
Jaipur

अधिशाषी अभियन्ता
नगर परिषद, कोटपूतली

Technocraft Construction Pvt. Ltd.

SFC Environmental Technologies Pvt. Ltd. NAVI MUMBAI

ABBREVIATIONS

BOD_3	:	3 Day Biochemical Oxygen Demand (at 27°C)
BOD_5	:	5 Day Biochemical Oxygen Demand (at 20°C)
COD	:	Chemical Oxygen Demand
TSS	:	Total Suspended Solids
VSS	:	Volatile Suspended Solids
NH_4-N	:	Ammoniacal Nitrogen (as N)
TKN	:	Total Kjeldhal Nitrogen (as N)
NO_3-N	:	Nitrate Nitrogen (as N)
TP	:	Total Phosphorous (as P)
SVI	:	Sludge Volume Index
SRT	:	Solids Retention Time
MLSS	:	Mixed Liquor Suspended Solids
MLVSS	:	Mixed Liquor Volatile Suspended Solids
RAS	:	Return Activated Sludge
SAS	:	Surplus Activated Sludge
W	:	working
S	:	Standby
SS	:	Store Standby

Technocraft Construction Pvt. Ltd.

SFC Environmental Technologies Pvt. Ltd. NAVI MUMBAI

INTRODUCTION

Municipal Council Kotputli has placed an order on ***M/s. Technocraft Construction Pvt. Ltd*** for Design, Supply, Construction, Installation, and Commissioning of **10 MLD** capacity Sewage treatment plant using **Sequential Batch Reactor (SBR)** Technology at **Kotputli, Rajasthan.**

M/s. Technocraft Construction Pvt. Ltd **is** sourcing the Cyclic Activated Sludge Technology (C-Tech) component of the STP from **SFC Environmental Technologies Pvt. Ltd. SFC** is a global wastewater treatment technology company. It has its headquarters in Mumbai with group companies in various parts of the world. SFC holds the patent rights of C-Tech process. This technology is extensively used for treatment of domestic sewage and industrial wastewater to highest possible quality at a very low cost of treatment and by using minimum space. There are numerous plants working worldwide and in India based on this technology.

This is the Basic Engineering Package for the C-Tech system.

Technocraft Construction Pvt. Ltd.

SFC Environmental Technologies Pvt. Ltd. NAVI MUMBAI

DESIGN BASIS

A BASIS OF DESIGN

h

1 Flow

A

a	Average Flow	=	10.00	MLD
		=	416.67	m^3/hr.
b	Other Flow (Assumed)	=	0.410	MLD
			17.083	m^3/hr.
c	Total Average Flow = a + b	=	10.41	MLD
		=	433.75	m^3/hr.
		=	0.120	m^3/sec
d	Peak Factor	=	2.25	
e	Peak flow = a x d	=	937.50	m^3/hr.
f	Other Flow (Assumed)	=	17.083	m^3/hr.
g	Total Peak flow = e + f	=	954.60	m^3/hr.
		=	0.266	m^3/sec

2 RAW SEWAGE CHARACTERISTIC (*As per tender, Sub Section 2 STPs & associated works, 1.4 Raw Sewage Quality, Page No. 93*)

BOD_5	=	300	mg/L
COD	=	650	mg/L
TSS	=	650	mg/L
TKN	=	55	mg/L
TP (as P)	=	6.0	mg/L

3 DESIGN QUALITY OF TREATED SEWAGE (*As per tender, Sub Section 2 STPs & associated works, 1.5 Treated Sewage Quality, Page No. 93*)

BOD_5 @ 20° C	≤	10	mg/L
COD	≤	50	mg/L
TSS	≤	10	mg/L
NH4-N	≤	5	mg/L
TN (as N)	≤	10	mg/L
TP (as P)	≤	2	mg/L

Annexure

e text here

Note:

1. *Any variation in the Inlet Design Parameters as mentioned above may affect the performance of the System.*
2. *There should be no ingress of industrial effluent with the sewage.*
3. *Oil and Grease at the inlet of the C-Tech basin should be less than 10 mg/L, accordingly suitable Oil and Grease removal system should be provided before C- Tech basin.*

Technocraft Construction Pvt. Ltd.

SFC Environmental Technologies Pvt. Ltd. NAVI MUMBAI

PROCESS DESCRIPTION

Raw sewage after primary treatment (Fine Screens and Grit Chambers) is taken to C-Tech Basins by gravity.

C-Tech is a Cyclic Activated Sludge process technology which is the latest and 4th generation of Sequential Batch Reactor (SBR) process. The C-Tech system specifically refers to the use of variable volume treatment in combination with a biological SELECTOR and OXYGEN UPTAKE RATE (OUR) control, which is operated in a fed-batch reactor mode. The Cyclic Activated Sludge process technology represents a certain technical development of a process philosophy over conventional SBR technology.

The incorporation of a multi cell biological Selector in the front – end of the System distinguishes it from all other technologies (Generic SBRs). The raw sewage enters the Selector Zone, where anoxic-mix conditions are maintained. Also, a part of the treated effluent along with activated sludge from the Aeration Zone is recycled here using Return Activated Sludge (RAS) Pump. As the microorganisms meet high BOD and low DO condition in the Selector Zone, natural selection of predominantly floc-forming microorganisms takes place. This is very effective in containing all of the known low F/M bulking microorganisms, which eliminates problems of sludge bulking and sludge foaming. This process ensures excellent settling characteristics of the biological sludge. Also, due to the anoxic / anaerobic conditions in the Selector Zone, De-nitrification and Phosphorous removal occurs.

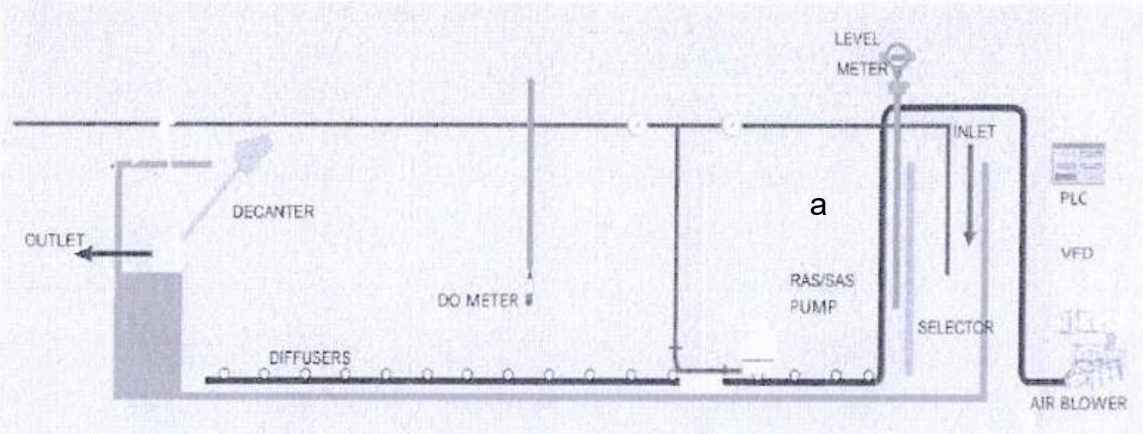


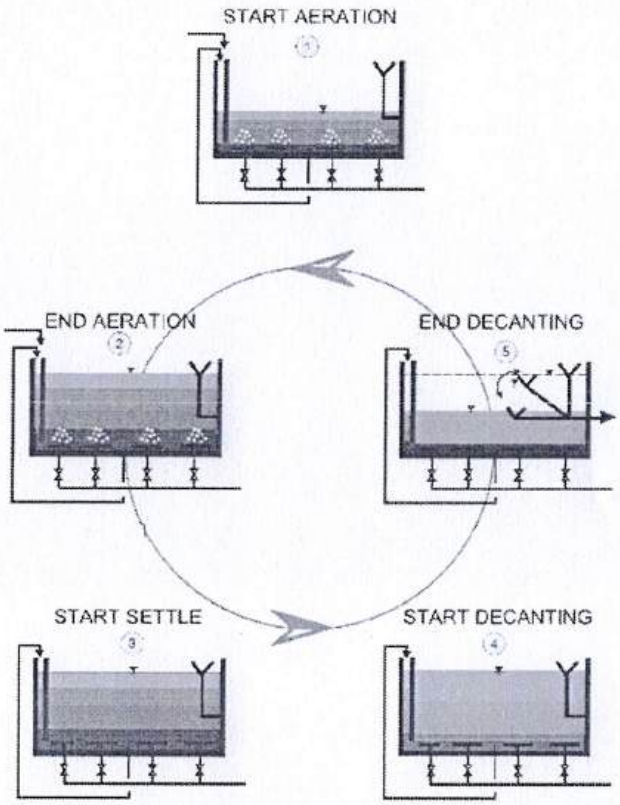
Fig 1. Components of C-Tech SBR System

There are **Two** operating C-Tech basins in the plant. These C-Tech basins work in sequence and the influent flow is distributed using Automatic Gates provided at the Inlet Chamber of C-Tech basins. The C-Tech basins are equipped with air blowers, diffusers, Return Activated Sludge (RAS) pumps, Surplus Activated Sludge (SAS) pumps, Decanters, Auto valves, Programmable Logic Controller (PLC) etc. All cycles will be automatically controlled using PLC.

The complete biological treatment is divided into Cycles with each Cycle is of 2.5-5 hrs. (3 hrs. in present case) duration, during which all treatment steps take place. A basic Cycle comprises of the following phases which take place independently in sequence to constitute a Cycle and then gets repeated:

- Fill / Aeration (F/A)
- Settling (S)
- Decanting (D)

Cyclic Operation



Fill / Aeration (F/A):

This refers to the process loading time in the cycle. Loading occurs outside of the designated settle and decant sequences during which time influent is received into the basin through an admixture (selector) reactor. Biomass from the main aeration zone is admixed with influent load in the biological selector hydrolysis reactor. Complete-mix reaction conditions prevail in the main reaction zone during this variable volume operational sequence, being typical of a fed-batch reactor operation. Aeration can be regulated to maximize co-current nitrification-de-nitrification that takes place and to insure the aerobic uptake of phosphorus previously released during anaerobic operation. The process typically employs a nominally constant rate of recycle from the main reaction zone that is pumped to a zone at the inlet end of the admixture reactor.

Settling (S):

The air is turned off and influent to the reactor basin is stopped. During the first five minutes of this sequence, the residual mixing energy within the reaction basin is consumed. At this time, gentle bio-flocculation initially takes place and solids-liquid interface forms under partial hindered settling conditions. Rising sludge does not occur.

Decanting (D):

This sequence is an extension of the settle sequence and is also totally quiescent whereby a moving weir lowering decanter is used to take the operating liquid level in the basin to its designated bottom water level reference position. In this way supernatant is withdrawn from a subsurface position under laminar flow conditions. This allows optimum removal over the decant depth without entrainment of settled solids or floating debris. Upon completion of the supernatant liquid removal sequence, the moving weir decanter returns to its rest position located out of liquid. Completion of the decant sequence terminates the designated use of the basin as a stratified, interrupted inflow reactor. Typically, fill sequencing begins while the decanter is travelling to its upper rest position.

Excess sludge at a consistency level of approx. 0.8 % will be pumped intermittently from SAS pump to the Sludge Sump. The sludge from Sludge Sump is taken for dewatering and finally for its ultimate disposal.

BOD REMOVAL, CO-CURRENT NITRIFICATION & DENITRIFICATION AND ENHANCED PHOSPHORUS UPTAKE IN AERATION ZONE

BOD Removal

The aeration zone of C-Tech is provided with diffused aeration system to oxidize the organic matter by activated sludge.

The activated sludge in aeration zone is capable of converting most organic wastes to stable inorganic forms or to cellular mass. In this process, the soluble and colloidal organic material is metabolized by a diverse group of microorganisms to carbon dioxide and water. At the same time, a sizeable fraction of incoming organic matter is converted to cellular mass that can be separated from the effluent by settling.

Activated sludge comprises a mixed microbial culture wherein the bacteria are responsible for oxidizing the organic matter, while protozoa consume the dispersed un-flocculated bacteria and rotifers consume the unsettled small bio-flocs in the treated wastewater, performing the role of effluent polishers.

The utilization of substrate by a bacterial cell can be described as a three-step process:

1. The substrate molecule contacts with the cell wall.
2. The substrate molecule is transported into the cell.
3. Metabolism of the substrate molecule within the cell

However, as the bacteria require the molecule in the soluble form, colloidal, spherically incompatible molecules, which cannot be readily biodegradable, have to be first adsorbed to the cell surface and hydrolyzed or transformed externally to transportable fractions by exo-enzymes or wall-bounded enzymes. The organic matter will be utilized by the bacteria resulting in cell synthesis and energy for maintenance. Nutrients available in the wastewater cater to the nutrient requirements of the aerobic microorganisms and

to enhance the activity of the aerobic microbes.

In addition to the nutrient requirements, the aerobic microbes require oxygen to sustain their microbial activity. Oxygen functions as a terminal electron acceptor in the energy metabolism of the aerobic heterotrophic organisms indigenous to the activated sludge process. In other words, a portion of the organic material removed is oxidized to provide energy for the maintenance function and the synthesis function.

The following reactions best describe the organic substrate utilization by the aerobic bacteria:

1. **Oxidation**

$$COHNS + O_2 + Bacteria \rightarrow CO_2 + NH_3 + other\ End\ Products + Energy$$

2. **Synthesis**

$$COHNS + O_2 + Bacteria \rightarrow C5H7O2N\ (New\ Bacterial\ Cell)$$

3. **Endogenous Respiration**

$$C_5H_7O_2N + 5O_2 \rightarrow 5CO_2 + NH_3 + 2H_2O + Energy$$

It is to be noted that the activated sludge in C Tech reactor operates in extended aeration mode. An extended aeration activated sludge process operates in the endogenous respiration phase of the growth curve where the microorganisms are forced to metabolize their own protoplasm due to the limited availability of food or substrate. During this phase, the nutrients remaining in the dead cells diffuse out to furnish the remaining cells with food. This system has been developed for application where minimum bio-solids production is desirable. Less solids production is achieved by using a larger fraction of the entering organic material for energy rather than for synthesis. This means that more oxygen will be consumed per unit mass of organic material removed.

Nitrification

Extended Aeration system, with high sludge retention time (θ_c) and DO > 2.0 mg/L ensures uniform nitrification. Nitrification results from the oxidation of ammonia present in the sewage by Nitrosomanas to nitrite and the subsequent oxidation of the nitrite to nitrate by Nitrobacter. The nitrifying organisms are strict aerobes and require more than 2 mg/L DO in the C-Tech basin to avoid oxygen limitation. The nitrification of ammonia can be represented as given below:

$$2\,NH_4^+ + 3O_2 \xrightarrow{\text{NITROSOMONAS}} 2NO_2^- + 2\,H_2O + 4\,H^+ + \text{New Cells}$$

$$2\,NO_2^- + O_2 \xrightarrow{\text{NITROBACTOR}} 2NO_3^- + \text{New Cells}$$

The diffused aeration system is sized in such a way that sufficient oxygen is provided for carbonaceous oxidation, sludge stabilization, nitrification by maintaining the DO at the specified level of 2 mg/L. The capacity of diffused aeration in each C-Tech basin will be sufficient to ensure good and uniform mixing conditions during Fill - Aeration phase of the cycle of operation.

Denitrification:

The process of denitrification of nitrates is represented as:

$$NO_3^- + BOD \rightarrow N_2 + CO_2 + H_2O + OH^- + \text{cells}.$$

Denitrification releases nitrogen which escapes off as an inert gas to the atmosphere.

Co-Current Nitrification and denitrification

A balanced process is achieved and regulated by online-measuring of the specific oxygen uptake rate in the basin in such a way that the floc reaction profile allows for nitrification at the peripheral sections and denitrification at the inner parts of the floc as shown in Figure below.

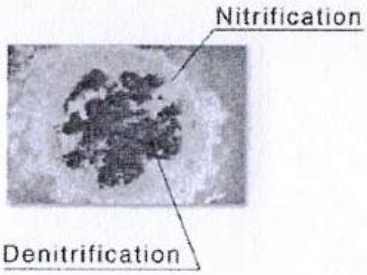


Fig.: Representative view of a sludge floc under a light microscope with suggested zones for co-N/DN

Nitrate penetration is governed by its rate of diffusion which is of the order of ten times that of dissolved oxygen. Under aerated conditions there is typically no nitrate limitation in the interior zone of the floc. Sufficient carbon provision for denitrification is achieved through the carbon storage (biosorption) mechanism and the proportional DO demand regulation which minimizes the use of substrate carbon by oxic metabolization. The process can be regulated such that during the aeration phase there is nitrification and also denitrification taking place within the flocs. Denitrification also takes place during settling phase. Rising of activated sludge due to nitrogen gas bubbling does not occur as during the relatively short time cycles only low concentrations of nitrate nitrogen have to be denitrified in each cycle.

Process control using in-basin respiration enables a direct control over biological phosphorus removal.

Enhanced Phosphorous Uptake

In aerobic zone PHB metabolized, providing energy from oxidation and carbon for new cell growth. The energy released from PHB oxidation to form polyphosphate bonds in cell storage so that soluble orthophosphate is removed from solution and incorporated into polyphosphates within the bacterial cell. As biomass is wasted after settling, stored phosphorus is removed from the reactor for ultimate disposal with the waste sludge.

PROCESS DESIGN CALCULATIONS

1.0 Basis of Design

a.	No. of Basins	=	2	Nos.
b.	MLSS	=	4200	mg/L

As per CPHEEO Manual page 5-198, value is 3500 to 5000 mg/L.

c.	F/M	=	0.125	d^{-1}

As per CPHEEO Manual page 5-198, Value is 0.05-0.3 d-1

d.	Sewage Temperature	=	20	°C

Considering the Geographic location and Climatic conditions at site.

e.	MLVSS/MLSS ratio	=	0.7	
f.	DO in basin	=	2	mg/L
g.	Altitude of site	=	349	m
h.	Humidity	=	80	%
i.	Ambient Air Temperature (Max.)	=	45	^{o}C

11.5 C-Tech Operating Cycle

a.	Filling and Aeration Phase (T_{FA})	=	1.5	hrs.
b.	Settling phase (T_S)	=	0.5	hrs.
c.	Decant Phase (T_D)	=	1	hrs.
d.	Total Cycle Time (T_C) = a + b + c	=	3	hrs.
	For the design of present STP, a Cycle time of 3 hrs. is considered as design basis. As per CPHEEO Manual (Pg. no. 5-198) standard cycle time lies in the range of is 2.5–6 hrs.			
e.	No of Cycles Per day/basin = 24/d	=	8	Nos.
f.	Hours of aeration time/day/basin = a x e	=	12	hrs.
g.	No. of basins receiving flow simultaneously	=	1	Nos.
h.	No. of basins aerating simultaneously	=	1	Nos.
i.	No. of basins decanting simultaneously	=	1	Nos.
j.	Average flow rate	=	433.75	m^3/hr.
k.	Average flow rate to each basin = j/g	=	433.75	m^3/hr.

C-Tech Basin Operating Sequence

Time, Hrs. →												
	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
Basin - 1	F/A	F/A	F/A	F/A	F/A	F/A	S	S	D	D	D	D
Basin - 2	S	S	D	D	D	D	F/A	F/A	F/A	F/A	F/A	F/A

F/A	Fill and Aeration Phase
S	Settling phase
D	Decanting Phase

3.0 Calculation of SBR Volume & HRT

3.1 Calculation of SBR Volume

a.	Daily flow	=	10410.00	m^3/d
b.	Inlet BOD_5	=	300.00	mg/L
c.	MLSS	=	4200.00	mg/L
d.	MLVSS/MLSS ratio	=	0.70	
e.	MLVSS = c × d	=	2940.00	mg/L
f.	F/M	=	0.125	
g.	Total volume of basins = (a×b)/(e×f)	=	8497.96	m^3
h.	No. of basins provided	=	2.00	Nos.
i.	Volume of single basin required= g/h	=	**4248.98**	**m^3**

3.2 Fill Volume and C-Tech Area Requirement

a.	Peak Flow rate	=	954.60	m^3/hr
b.	No. of basins receiving flow simultaneously	=	1.00	Nos.
c.	Flow rate per basin = a/b	=	954.60	m^3/hr
d.	Fill/Aeration Time	=	1.50	hrs.
e.	Fill volume per basin =c × d	=	1431.90	m^3
f.	Decant depth Considered	=	**2.00**	m
g.	Basin surface area required for assumed decant depth = e/f	=	715.95	m^2

Peak Flow Handling Capacity of C-Tech SBR Basins

As presented in above calculation, the C-Tech basins are designed to take care of flow variations like peak flow, average flow and lean flow spanning over a day. SBR basins have variable water level with varying levels between TWL (Top Water Level) and BWL (Bottom Water Level). The maximum water level of the basin is achieved when the plant receives peak hydraulic capacity. The peak flow is preceded and succeeded by lean flow. As per flow variations in the feed to SBR basins, the water varies between TWL & BWL. As SBR is a batch process, whatever flow enters the basin; it is contained within the basin (as there is no outflow during inlet/filling time) and treated over a longer period. Therefore, the decanting system decants only at average flow in any cycle. Each SBR basin is equipped

with level transmitter and each decanter mechanism is equipped with position sensor and level sensor. Based on the signals received from level transmitter, position sensor and level sensor, the decanting rate is controlled through PLC system to discharge at average flow.

3.3 Calculation of SWD

a.	Volume of Basin Required	=	4248.98	m^3
b.	Area of Basin Provided	=	716.30	m^2
c.	SWD of Basin required = a/b	=	5.93	m
d.	SWD of Basin Provided	=	**6.00**	**m**

3.4 Provided Volume of SBR

a.	Area Required per C-Tech Basins	=	715.95	m^2
b.	Area Required for all C-Tech Basins	=	1431.9	m^2
c.	Diameter Required for C-Tech Basins	=	42.7	m
d.	Diameter Provided for C-Tech Basins	=	42.7	m
e.	Total Volume offered	=	8592.1	m^3
	Considering one circular basin with compartment	=		
	Assuming width of wall (W)	=	0.8	m
	Assuming length of wall (L)	=	42.7	m
	Height of wall (H)	=	6.0	m
	Volume of common wall inside basin	=	205.0	m^3
	Total no. of wall	=	1.0	No.
f.	Total Volume occupied by common walls	=	205.0	m^3
g.	Total Volume of C-Tech basins including common wall = e + f	=	8797.1	m^3
h.	Area of total C-Tech Basins= g/SWD	=	1466.2	m^2
i.	Diameter required for total C-Tech Basins	=	43.2	m
j.	Diameter provided for Aeration Basin	=	**43.3**	**m**
k.	Total Volume Provided = $\pi/4$ x j x j x SWD	=	8835.3	m^3
l.	Freeboard provided in the C-Tech basin	=	0.5	m
m.	Total Depth of the C-Tech basin = I + T	=	6.5	m

3.5 Calculation of HRT

a.	Total volume of basins provided = k - (DIA x W x SWD)	=	8627.5	m^3
b.	Daily flow	=	10410.0	m^3/d
c.	**HRT = a/b × 24**	=	**19.89**	**hrs.**

RECIRCULATION FLOW REQUIREMENT AND SELECTOR SIZING

The incorporation of a biological SELECTOR in the front zone of the C-Tech Systems distinguishes it from all other technologies. This is very effective in containing all of the known low F/M bulking microorganisms, eliminates problems of bulking and foaming. This process ensures excellent settling characteristics of the sludge. SVI < 100 is achieved in all seasons. The figure below shows the experience with SVI developments in a C-Tech plant with municipal sewage with SVI in the range of 25 to 60 mL/g that is observed over a period of over 240 days. Due to the anaerobic conditions in the SELECTOR zone, phosphorous release also occurs.

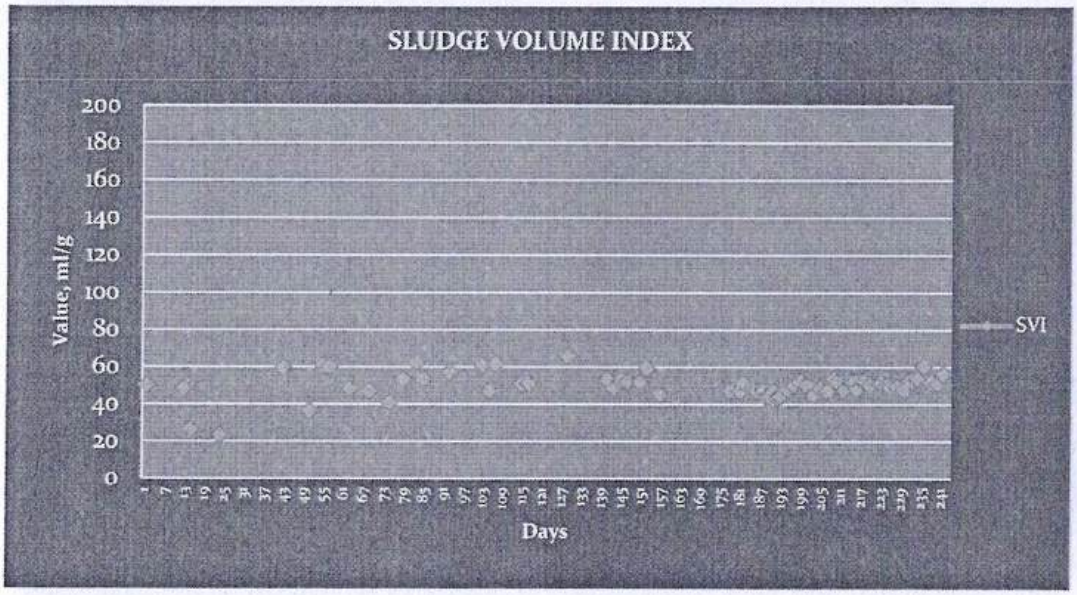


Fig: SVI of a C-TECH plant

Selector Functioning

The wastewater enters into the selector zone from the front end of the C-Tech reactor, where anoxic/anaerobic conditions are maintained. In addition, return sludge from the aeration basin is also recycled using RAS pumps. As microorganisms meet high BOD, low DO conditions in the selector zone, natural selection of Phosphate Accumulating Organisms (PAOs) and floc-forming microorganisms takes place. This is very effective in containing all of the known low F/M bulking microorganisms and eliminates the problems of bulking and surface foaming. Also, due to the anoxic/anaerobic conditions in the selector zone, phosphorous release occurs. During anaerobic conditions, acetate is produced by fermentation of organic matter in the wastewater. Using the energy available from stored polyphosphates, the phosphorus accumulating organisms (PAOs) assimilate acetate and produce intracellular Polyhydroxybutyrate (PHB) storage products. Concurrent with the acetate uptake is the release of phosphate. The PHB content in the PAOs increases while the polyphosphate decreases. Simultaneously with the phosphorus release some denitrification also takes place in selector.

4.0 RECIRCULATION FLOW REQUIREMENT AND SELECTOR SIZING

4.1 RECIRCULATION FLOW

1 Recirculation Flow

a	Recirculation Ratio provided	=	25.0%	of Feed Flow per Basin
b	Feed Flow to each Basin	=	433.75	m^3/hr
c	Recirculation Flow required = b x a	=	108.44	m^3/hr
d	Capacity of Return Activated Sludge (RAS) Pump provided	=	**110.00**	**m^3/hr**

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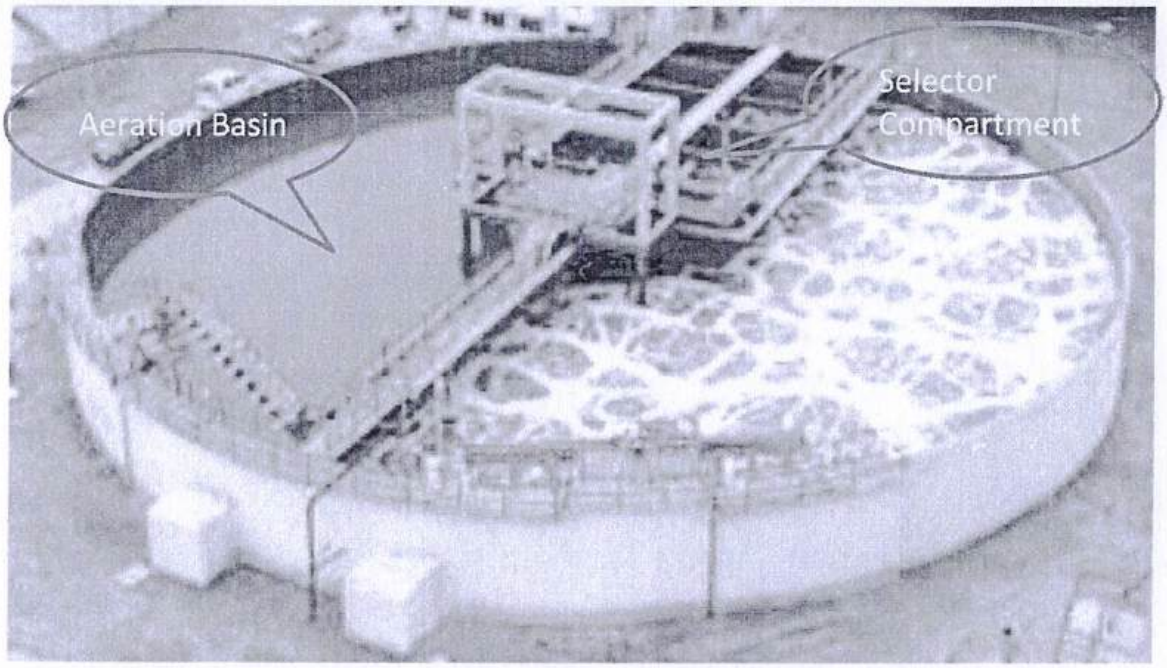
4.2 SELECTOR ZONE

A	Design Flow = Feed Flow + Recirculation Flow	=	543.75	m^3/hr
B	Hydraulic Retention Time HRT) provided at Design Flow	=	55.0	min
C	Volume required = (A x B) / 60	=	498.44	m^3
D	No. of Sub-Compartments provided per Basin	=	**6**	No.
E	Side Water Depth (SWD) provided	=	**6.00**	m
F	Area Required	=	83.07	m^2
G	Area Provided	=	83.10	m^2
H	Volume provided = E x G	=	498.60	m^3



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SLUDGE GENERATION

5.0 Total Sludge Generation

5.1 Biological Sludge Generation

A	Specific Sludge Yield	=	1.18	Kg/Kg BOD removed
B	BOD removed	=	3,019	Kg/day
C	Biological Sludge generated = B x A	=	3,563	Kg/day

5.2 Phosphorous Removal

a.	Plant Flow	=	10.41	MLD
b.	Influent Phosphorous	=	6.0	mg/L
c	Phosphorous in effluent	=	2.0	mg/L
d.	Daily phosphorous load = a × b	=	62.46	Kg/d
e	Phosphorous assimilation in biomass	=	2.5%	Inlet BOD_5
f.	BOD Removal	=	290.0	mg/L
g.	Biological Phosphorous removal = e × f	=	7.30	mg/L
h.	Phosphorous remaining	≤	2.0	mg/L

5.3 Total Sludge Generation

a.	Biological Sludge generated	=	3,563	Kg/day

5.4 Calculation of SAS pump Capacity

a.	Total Sludge Produced	=	3,563	Kg/day
b.	No. of Basins provided	=	2	Nos.
c.	Sludge to be Wasted per Basin = a / b	=	1,781.50	Kg/day
d.	No. of Cycles	=	8.0	Cycles/day/ Basin
e.	Sludge to be Wasted per Cycle per Basin = c / d	=	222.69	Kg/day
f.	Solids Consistency in the Wasted Sludge	=	0.80%	
g.	Specific gravity of sludge	=	1.05	
h.	Volume of Sludge to be Wasted per Cycle per Basin = e / (f X g x 1000)	=	26.51	m^3

i.	Considering Running Time of Surplus Activated Sludge (SAS) Pump per Cycle	=	10	min
j.	Capacity of SAS Pump required= (h x 60) / i	=	159.06	m^3/hr
k.	Capacity of SAS Pump provided	=	**160**	**m^3/hr**

5.5 Calculation of SRT

a	Total Volume of SBR	=	8627.5	m^3
b	MLSS	=	4200	mg/L
c	Sludge Generated	=	3563	Kg/day
d	Solids Retention Time (SRT) provided = (a x b) / (c x 1000)	=	**10.17**	Days

DESIGN OF AERATION SYSTEM

Fine Bubble Diffusers for Aeration

The aeration system can be thought of as the heart of the C Tech system. The system uses high quality fine bubble membrane diffusers for aeration. The system has highest oxygen transfer efficiency which can yield substantial cost savings and the membrane material is advanced quality PU which promotes extended diffuser life.

6.0 Oxygen Calculation:

A	Volume of sewage treated	=	10410.00	m^3/d
B	Theoretical Kg O_2 required per Kg BOD	=	1.20	-
C	Inlet BOD_5	=	300.00	mg/l
D	Outlet BOD_5	=	10.00	mg/l
E	BOD_5 removed = C - D	=	290.00	mg/l
F	Kg of BOD removed in a day = A x E / 1000	=	3018.90	kg/d
G	KgO_2 reqd. for BOD load = B x F	=	3622.70	kg/d
H	Inlet Total Kjeldhal Nitrogen	=	55.00	mg/l
I	Outlet Ammoniacal Nitrogen	=	0.70	mg/l
J	Nitrogen assimilated during BOD removal = (5/100) x E	=	14.50	mg/L
K	Outlet Nitrate Nitrogen	=	3.00	mg/l
L	NH3-N removed in a day = H – I – J	=	39.80	mg/l
M	Kg O_2 required per Kg of NH_3-N	=	4.56	-
N	Kg of NH_3-N removed in a day = A x L/1000	=	415.00	kg/d
O	KgO_2 reqd. for NH_3-N removal = M x N	=	1892	kg/d
P	KgO_2 released per Kg of Nitrate-Nitrogen during denitrification	=	2.86	-
Q	Kg of Nitrate-Nitrogen generated = A x L / 1000	=	414.40	kg/d
R	Kg of Nitrate Nitrogen in the Treated Sewage = A x K / 1000	=	31.23	kg/d
S	Quantity of Nitrate Nitrogen available for Denitrification = Q - R	=	383.17	kg/d
T	Denitrification as % of available Nitrate Nitrogen	=	75%	
U	Quantity of Nitrate Nitrogen that is denitrified = S x T	=	287.38	kg/d

V	KgO_2 released during Denitrification = P x U	=	821.90	kg/d
W	**Total KgO_2 required/d = G + O – V**	**=**	**4693.2**	**kg/d**

7.0 STANDARD OXYGEN TRANSFER REQUIREMENT (SOTR) CALCULATIONS

A	Actual Oxygen Transfer Rate (AOTR) under field conditions	=	4,693.2	Kg/day

B As per Equation 5-55, Pg No 429, Wastewater Engineering - Treatment and Reuse, Metcalf & Eddy..... **Standard Oxygen Transfer Rate (SOTR) in Tap Water at 20 ^{0}C and Zero Dissolved Oxygen: = AOTR ÷ [(($\beta C'_{S,T,H} - C_L$) ÷ $C_{S,20}$) x $1.024^{(T-20)}$ x α x F]**

Where,

AOTR = Actual Oxygen Transfer Rate under field conditions	=	4,693.2	Kg/day

As per Pg No 429, Wastewater Engineering - Treatment and Reuse, Metcalf & Eddy.....

$C'_{S,T,H}$: Average Dissolved Oxygen Saturation Concentration in Clean Water in Aeration Tank at Temperature 'T' and Altitude 'H'

= $C_{S,T,H}$ x (1/2) x ((P_d / $P_{atm,H}$)+O_t/21))

T = Sewage Temperature	=	20	^{0}C
H = Altitude of Site	=	349.0	m

As per Equation B-2, Pg No 1738, Wastewater Engineering - Treatment and Reuse, Metcalf & Eddy.....

$C_{S,T,H}$ = Oxygen Saturation Concentration in Clean Water at Temperature 'T' and Altitude 'H':

$C_{S,T,H} = C_{S,T}$ x exp(-(g x M x (z_b - z_a)) / (R x T))

Where,

$C_{S,T}$ = Oxygen Saturation Concentration in Clean Water at Temperature 'T' (Table D, Appendix D Pg No 1745)	=	9.08	mg/l
g = Acceleration due to Gravity	=	9.81	m/s^2
M = Mole of Air	=	28.97	Kg/Kg-mole
z_b = Elevation (Altitude 'H')	=	349.0	m
z_a = Elevation (Altitude Zero)	=	0	m
R = Universal Gas Constant	=	8,314	Nm/Kg-mole.K
T = Sewage Temperature	=	298.15	Kelvin

	Hence, $C_{S,T,H}$	=	**8.72**	mg/l

As per Equation B-2, Pg No 1738, Wastewater Engineering - Treatment and Reuse, Metcalf & Eddy.....

$P_{atm,H} = P_a \times \exp(-(g \times M \times (z_b - z_a)) / (R \times T))$

Where,

P_a = Pressure at Zero Altitude	=	10.33	mWC
g = Acceleration due to Gravity	=	9.81	m/s^2
M = Mole of Air	=	28.97	Kg/Kg-mole
z_b = Elevation (Altitude 'H')	=	349.0	m
z_a = Elevation (Altitude Zero)	=	0	m
R = Universal Gas Constant	=	8,314	Nm/Kg-mole.K
T = Field Temperature	=	318.15	Kelvin
Hence, $P_{atm,H}$	=	**9.95**	
P_d = Pressure at the Depth of Air Release **= $P_{atm,H}$ + Effective Aeration Depth**	=	14.7	mWC
O_t = % Oxygen Concentration leaving Tank	=	19.00	
Hence, $C'_{S,T,H}$	=	**10.38**	mg/l
C_L: Operating Oxygen Concentration	=	2.00	mg/l
$C_{S,20}$: Dissolved Oxygen Saturation Concentration in Clean Water at 20^0 C and 1 atm (Table D, Appendix D Pg No 1745)	=	9.08	mg/l
α: Oxygen Transfer Correction Factor	=	0.65	
β: Salinity - Surface Tension Correction Factor	=	0.95	
F: Fouling Factor	=	0.90	

As per Tender, Volume 2A, Clause 4.8.2.4 (B), Sequential Batch Reactor Process including Biological Nutrient & Phosphorous Removal.

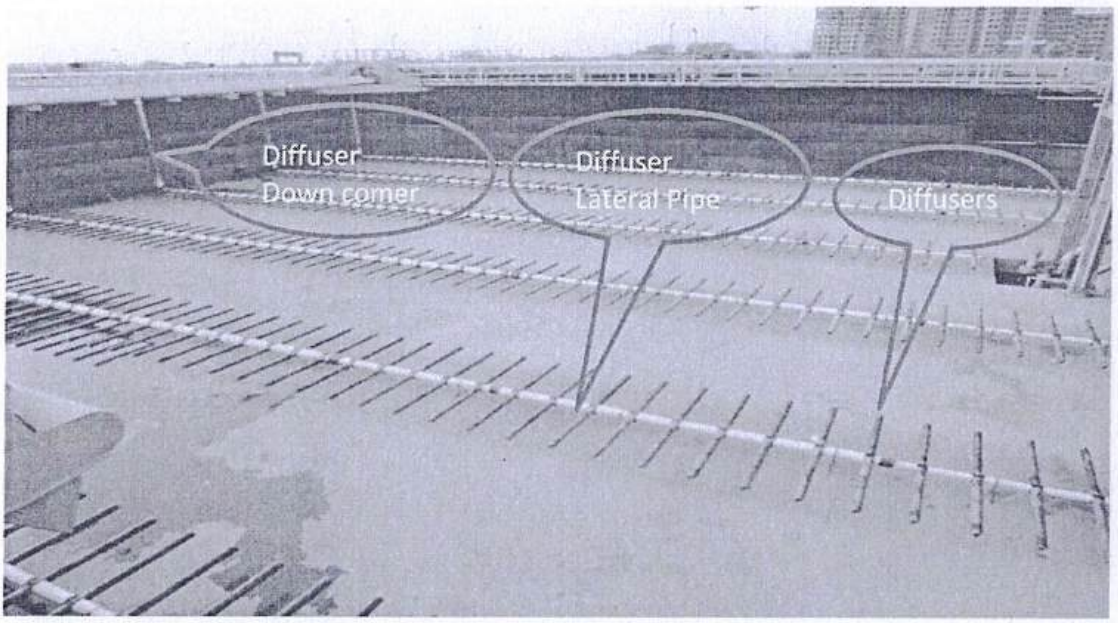
	Hence, SOTR	=	**9,263**	Kg/day
	SOTR per basin per day	=	**4,631.50**	Kg/day/basin
	SOTR per basin per hr.	=	**385.96**	Kg/hr/basin
C	No. of Basins	=	2	Nos.

D	Standard O2 required at Field Conditions per Basin = B / C	=	4,632	Kg/day/Basin
E	Top Water Level (TWL) in C-Tech Basins	=	6.00	m
F	Bottom Water Level (BWL) in C-Tech Basins	=	4.00	m
G	Aeration Depth	=	5.00	m
H	Height at which Diffusers are kept	=	0.25	m
I	Effective Aeration Depth = G - H	=	4.75	m
J	SOTE for the above Effective Aeration Depth	=	26.00	%
K	Fraction of O_2 in Air	=	23.00	%
L	Density of air at Standard Condition	=	1.293	kg/m3
M	Air required at Field Conditions per Basin = D / (J x K x L)	=	59,899	Nm^3/day/Basin
N	Hours of Aeration per Basin per day	=	12	hr/day/Basin
O	Air required per hour per Basin = M / N	=	4,992	Nm^3/hr/Basin
P	No. of Operating Air Blowers per Basin	=	**2**	Nos.
Q	Capacity of Air Blowers required = O / P	=	2,496	Nm^3/hr
R	Capacity of Air Blowers provided (at 0 °C & 1 atm.)	=	**2,500**	Nm^3/hr
S	Number of Basins per set of Air Blowers	=	2	Nos.
T	Number of Basins	=	2	Nos.
U	Number of Operating Air Blowers = P x U / T	=	**2**	Nos.
V	Number of Standby Air Blowers	=	**1**	Nos.

8.0 Calculation of Air Flow Requirement for Actual Field Condition.

Air flow	=	2,550	Nm^3/h
Field Temperature, T	=	45	Deg.C
Field Temperature, T	=	318.15	K
Relative humidity, RH	=	80	%
Altitude, H	=	349	m
Molar mass of water, MH_2O	=	18.02	g/mol
Molar mass of dry air, M_{dry}	=	28.96	g/mol
Water vapour saturation pressure, p_{ws}	=	$e^{(77.3450+0.0057T-7235/T)}/T^{8.2}$	Pa
	=	9556.00	

Atmospheric pressure at given altitude, P	=	exp(-9.81*28.97*Altitude / (8314*(273.15+Field temp.)))*10.33	
	=	9.95	mWC
	=	97573.95	Pa
Partial pressure of water vapour in moist air, p_w	=	(RH/100)*p_{ws}	Pa
	=	7644.77	
Humidity ratio, x	=	0.62198*p_w/(p_a-p_w)	
	=	0.05	kg/kg
Density of dry air at temp T & altitude H	=	P*9.81/100*28.97/8314/ (273.15+T)*10^5	
	=	1.07	kg/m^3
Density of moist air at T & H	=	Density of dry air(1+x)/(1+1.609x)	
	=	1.04	
Air flow at field conditions	=	3116.24	m^3/h
	=	3120.00	m^3/h



DECANTATION

The clear supernatant is removed from the basin using a stainless-steel Decanter. During decanting, there is no inflow to the basin. The moving weir DECANTER is motor driven and travels slowly from its "park" position to a designated bottom water level. Variable frequency drives are provided to control the rate of movement of the Decanters. After the required level of supernatant is removed, the Decanter is returned to its "park" position through reversal of the drive. The basin is now ready for the next cycle to begin. Stainless steel fabrication ensures resistant to corrosion, long equipment life without any/no maintenance.

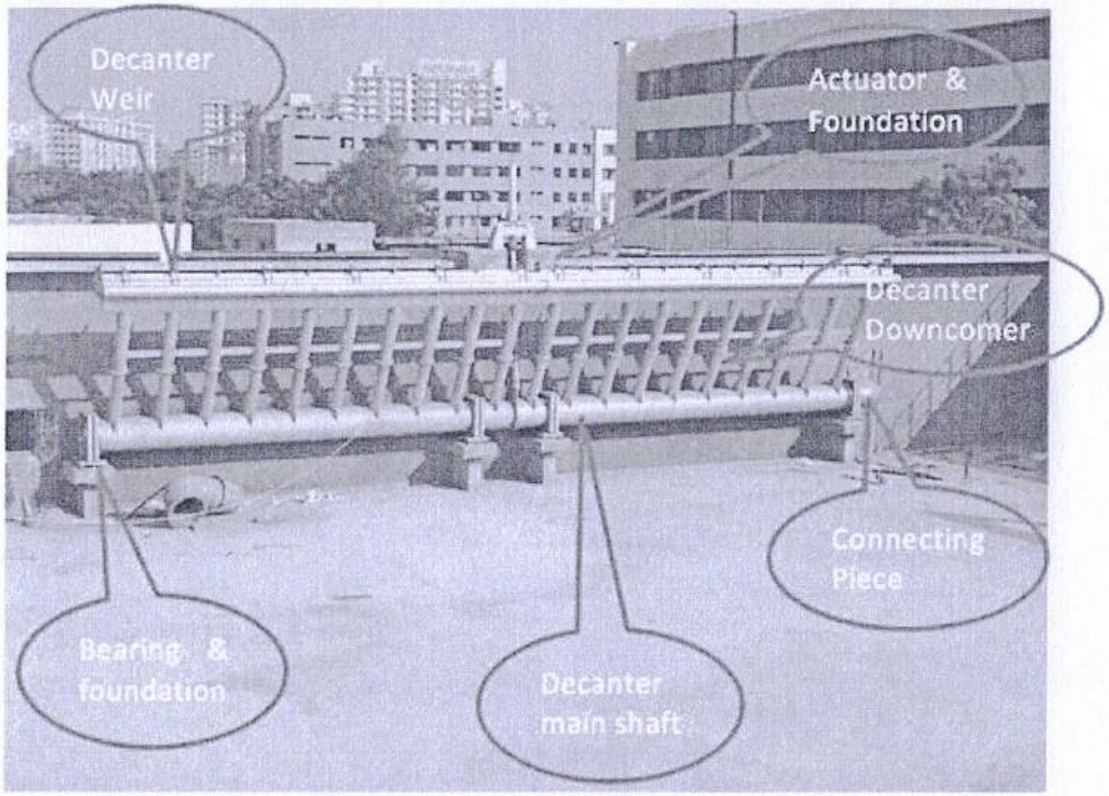
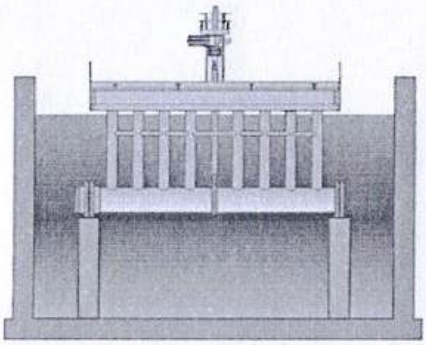
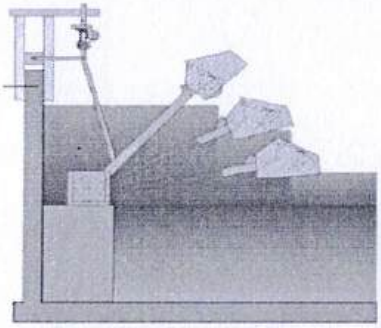


Fig. Pictorial view of Decanter (Image for reference only)



MAXI - RATE DECANTER



MAXI-RATE DECANTER

Fig. DECANTER of the C-TECH process

9.0 Decant Flow

a.	Fill volume per basin/cycle = (Flow rate × fill time) / no of basins filling simultaneously.	=	625.0	m^3
b.	Decanting volume per basin/cycle	=	625.0	m^3
c.	Decant time	=	1	Hr.
d.	Decant Flow = b/c	=	625.0	m^3/hr

DESIGN OUTPUT

Parameters		As per BEP	As per Tender/CPHEEO	Unit
Daily Flow	=	10000	10000	m^3/d
Other Flow (Assumed)		410	-	m^3/d
Peak Factor	=	2.25	2.25	
Peak Flow + other flow	=	954.60	-	m^3/hr
Each Basin Volume	=	4296.05	-	m^3
No. of Basins	=	2.0	-	Nos.
Total Basin Volume	=	8592.1	-	m^3
Total Cycle Time	=	3	2.5-6	Hrs.
HRT	=	19.89	-	Hrs.
MLSS	=	4200	3500-5000	mg/L
SRT (θc)	=	10.17	-	days
F/M	=	0.125	0.05 to 0.3	d^{-1}
Sludge Yield	=	1.180	-	Kg / Kg BOD removed
Total sludge generation per day	=	3,563	-	Kg/d

INSTRUMENT AND CONTROL PHILOSOPHY

The Biological system based on C-Tech Technology will be fully controlled and automatic. Various operations in the basins will be controlled by PLC as follows:

i) Auto - Valve Operation

a) **C-Tech Basin Inlet Gates:** Will on/off automatically based on input from PLC to the Gate to allow inflow of wastewater in the selected basin. Based on the pre-decided cycle time, PLC will command one of the inlet Gates to open and receive the influent for a specified time.

b) **Main Air Header Valves:** Will on/off automatically based on input from PLC to the Valve to allow inflow of air in the Aerating basin. Based on the pre-decided cycle PLC will command one of the valves to open and supply air to the basin for a specified time. This valve will remain open throughout the entire filling and aeration phase of the basin and will remain closed during other phases of the basin.

c) **Selector Air Header Valves:** Will on/off automatically based on input from PLC to the Valve to allow inflow of air in selector area of the basins. Based on the pre-decided cycle PLC will command one of the valves to open and supply air to the basin's selector for a specified time. The valve will be under open condition only when main Air Header Valve is open and will be open for the same basin only.

ii) Instruments

a. **Level Transmitter:** Provides input to PLC about the fill and decanted volume. Also regulates the speed of decanter based on the depth of water to be decanted by controlling the VFD connected to Decanter.

b. **DO Analyzer:** Analyses the DO levels in the tank on continuous basis based on which Air Blower rpm is automatically adjusted through connected VFD with help of PLC to maintain set point DO value in the basin.

c. **Decanter Level Positioner:** Limits the upward / downward movement of decanter while basin is under decantation.

d. **Decanter Level Sensor:** Monitors and controls the downward movement of decanter while basin is under decantation.

iii) Equipment

a. **Return Activated Sludge (RAS) Pump:** On / off of the pump is regulated by PLC. The pump starts for the basin, which is receiving the influent in the basin and stops only when aeration cycle for the basin is completed. The pump does not operate during Settling and Decanting phase of the cycle.

b. **Surplus Activates Sludge (SAS) Pump:** On / off of the pump is regulated by PLC for a specified duration in a treatment cycle, during the decanting phase of the cycle.

EQUIPMENT LIST FOR C-TECH SYSTEM

Sr. No.	Description	Specification	Nos.
1.	Inlet Gate to C-Tech basin	Auto Gate	2 Nos.
2.	Air blowers	2,500 Nm^3/hr @ 0.70 Kg/cm^2 (At 0 °C & 1 atm.) 3,120 m^3/hr @ 0.70 Kg/cm^2 (At Actual Field Condition)	3 Nos. (2W+1SB)
3.	VFD for air blower	Suitable	1 Nos.
4.	Soft Starter for air blower	Suitable	2 Nos.
5.	Diffuser assembly	Fixed Type	1 lot
6.	Decanters with positioner and Drive	Suitable	2 Nos.
7.	VFD for auto rate control of decanters	Suitable	2 Nos.
8.	RAS Pumps	110 m^3/hr @ 5.0 m. head*	3 Nos. (2W+1SS)
9.	SAS Pumps	160 m^3/hr @ 10 m. head*	3 Nos. (2W+1SS)
10.	Piping and Valves	Suitable	1 Lot
11.	Main Air Header Valve	Auto Butterfly	2 Nos.
12.	Selector Air Header Valve	Auto Butterfly	2 Nos.
13.	Selector Down Comers Valve	Manual Ball	12 Nos.
14.	SAS Pump Discharge	Motorized Knife Gate Valve	2 Nos.
15.	Instrumentation and Controls		
a)	PLC and control panel	-	1 No.
b)	DO Transmitter	Fixed Type Optical	2 Nos.
c)	Level Transmitter	Hydrostatic Type	2 Nos.

*** Head to be decided as per actual location of Sludge Sump & Hydraulics.**

अधिशाषी अभियन्ता
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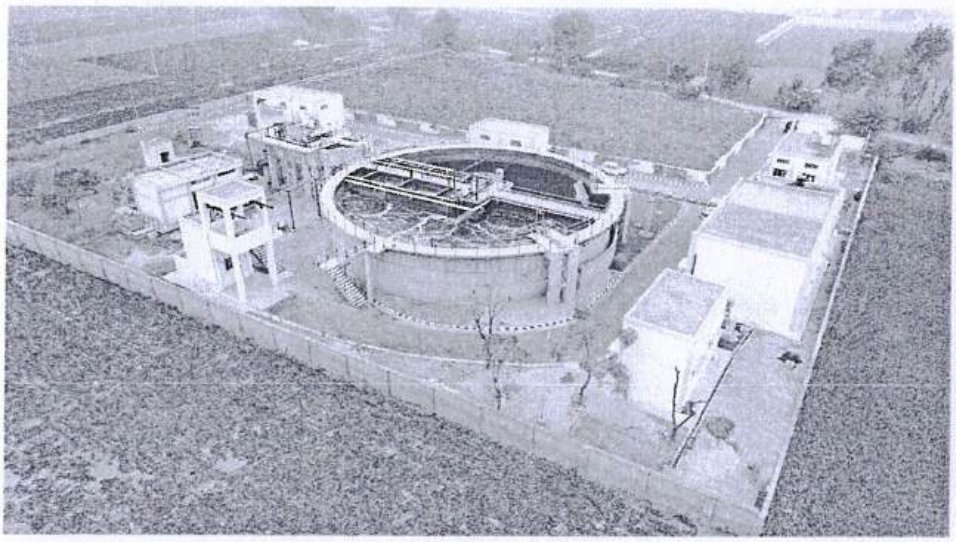
10 MLD SEWAGE TREATMENT PLANT BASED ON SBR TECHNOLOGY



Picture for representation purpose.

OVERALL ENGINEERING PACKAGE

OF

MAIN PUMPING STATION & SEWAGE TREATMENT PLANT AT KOTPUTALI, RAJASTHAN

FOR

MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN.

CONTRACTOR

M/S. TECHNOCRAFT CONSTRUCTION PVT. LTD.

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TECHNOLOGY PROVIDER

SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD.

Revision	R0	May, 2024

अधिशाषी अभियन्ता
नगर परिषद, कोटपूतली

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

INDEX

INDEX 1

SECTION-1 3

1 DESIGN INLET & OUTLET CHARACTERISTICS 4

SECTION-2 6

2. TREATMENT UNIT DESCRIPTION 7

2.1 GENERAL 7

2.2 RAW SEWAGE PUMPING STATION 8

2.3 PRIMARY TREATMENT 10

2.4 SEQUENTIAL BATCH REACTORS (C-TECH) UNITS 11

2.5 CHLORINATION SYSTEM (GAS CHLORINATION) 11

2.6 TREATED WATER STORAGE AND DISTRIBUTION SYSTEM 12

2.7 SLUDGE DEWATERING UNITS 12

SECTION-3 DESIGN CALCULATIONS 14

SECTION-4 BASIC ENGINEERING PACKAGE FOR SBR 28

SECTION – 5 HYDRAULIC CALCULATIONS 29

SECTION –6 DRAWINGS 39

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

Abbreviations

BOD	Biochemical Oxygen Demand
BWL	Bottom Water Level
C Tech	Cyclic Activated Sludge Treatment Process
CCT	Chlorine Contact Tank
CI	Cast Iron
COD	Chemical Oxygen Demand
DO	Dissolved Oxygen
Hr	Hour
m	Meter
M^3/hr	Cubic meter per Hour
M^3/sec	Cubic meter per Second
MLD	Million Litres per Day
mm	Millimetre
P	Phosphorous
RAS	Return Activated Sludge
RCC	Reinforced Cement Concrete
SAS	Surplus Activated Sludge
SB	Standby
SBR	Sequencing Batch Reactor
Sec	Second
TN	Total Nitrogen
TOC	Top of Concrete
TSS	Total Suspended Solids
TWL	Top Water Level
W	Working

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

SECTION-1

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

1 Design Inlet & Outlet Characteristics

1.1 General

The following parameters from the tender are considered for the design of 10 MLD STP at Kotputli, Rajasthan.

1.2 Design Flows for 10 MLD sewage treatment plant *(As per tender, Volume - I section V Scope of Work, Page No. 92)*

Average Flow	:	10 MLD
Peak Factor	:	2.25
Peak Flow	:	22.50 MLD
Centrate Flow (Assumed)	:	0.410 MLD
Total Average Flow	:	10.41 MLD
Total Peak Flow	:	22.91 MLD

For Civil Work of MPS (As per Tender, Volume - I section V Scope of Work Page No. 92)

Ultimate Average Flow	:	24.99 MLD
Peak Factor	:	2.25
Peak Flow	:	56.64 MLD
Centrate Flow	:	0.410 MLD
Total Average Flow	:	25.40 MLD
Total Peak Flow	:	56.64 MLD

1.3 Design Inlet (*As per tender, Sub Section 2 STPs & associated works, 1.4 Raw Sewage Quality, Page No. 93*)

SR. NO.	PARAMETER		DESIGN VALUE	UNIT
1	Biochemical Oxygen Demand (BOD_5)	=	300	mg/l
2	Chemical Oxygen Demand (COD)	=	650	mg/l
3	Total Suspended Solids (TSS)	=	650	mg/l
4	Total Kjeldahl Nitrogen (TKN)	=	55	mg/l
5	Total Phosphorous (TP)	=	6.0	mg/l
6	pH	=	6-9	

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

1.4 **Outlet Parameters** (***As per tender, Sub Section 2. STPs & associated works, 1.5. Treated Sewage Quality, Page No. 93***)

SR. NO.	PARAMETER		DESIGN VALUE	UNIT
1	Biochemical Oxygen Demand (BOD_5)	≤	10	mg/L
2	Chemical Oxygen Demand (COD)	≤	50	mg/L
3	Total Suspended Solids (TSS)	≤	10	mg/L
4	NH4-N (as N)	≤	5	mg/L
5	Total Nitrogen (TN)	≤	10	mg/L
6	Total Phosphorous (TP)	≤	2	mg/L
7	Faecal Coliform	≤	100	MPN/100 mL

NOTES:

1. *There should be no ingress of industrial effluent with the sewage.*

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

SECTION-2

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

2. Treatment unit description

2.1 General

The proposed Sewage Treatment Plant (STP) at Kotputli of capacity 10 MLD comprises of the following units:

a. Raw Sewage Pumping Station
   i. Receiving Chamber
   ii. Coarse Screen Channels
   iii. Raw Sewage Sump
   iv. Raw Sewage Transfer Pumps

b. Primary Treatment
   i. Stilling Chamber
   ii. Fine Screen Channels
   iii. Grit Separator

c. Sequential Batch Reactor (SBR) Units

d. Chlorination System

e. Sludge Dewatering Units
   i. Sludge Sump and sludge transfer pumps
   ii. Mechanical Dewatering Unit

f. Treated sewage Underground Reservoir

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

2.2 Raw Sewage Pumping Station

2.2.1 Receiving Chamber

Receiving chamber is provided to receive the sewage from the box drain from Nallah. The objective of receiving chamber is to reduce the turbulence of flow for achieving better efficiency in screening.

Receiving Chamber

Design Flow	:	56.64 MLD
Number of Units	:	1 No.
Material of Construction	:	RCC

2.2.2 Coarse Screen Channels

Raw sewage from the receiving chamber shall be allowed to flow by gravity into the Channels. There shall be two numbers of parallel screen channels out of which one will be fitted with Mechanical screen (Working) and the other with manual screen (stand by). The Mechanical Coarse Screen shall be rake type screen with automatic mechanism to remove the floating and other solid material of more than 20 mm size. The screened material shall be removed by belt conveyor through Chute to wheel barrow / trolley placed at Ground Level. Sluice gates are considered on upstream of screen channels to regulate the sewage flow as well as to isolate the flow during the maintenance.

Mechanical Coarse Screen Channel

Design Flow	:	56.64 MLD
Number of Units	:	2 No. (1W + 1S)
Material of Construction	:	RCC

Mechanical Coarse Screen

Design Flow	:	56.64 MLD
Number of Units	:	2 No. (1W + 1S)

2.2.3 Raw Sewage Sump (Wet Well)

All the civil units of raw sewage pumping station are designed for ultimate Average flow of 24.99 MLD + recycle flow and associated peak flow. However, the pumping machinery is provided to cater present flow of 10 MLD and associated peak flow.

After screening and grit removal the raw sewage shall enter into Raw Sewage Sump (wet well) of Sewage Pumping Station. Submersible pumps of suitable capacity have been considered to pump the raw sewage

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

from Wet-Well to the stilling Chamber.

Raw Sewage Sump

Design Flow	:	56.64 MLD
Number of Units	:	1 No.
Material of Construction	:	RCC

2.2.4 Raw Sewage Transfer Pumps

Raw sewage from wet well will be lifted to the stilling Chamber with the help of sewage transfer pumps. Raw sewage pump details are as below:

Raw Sewage Transfer Pump 1

Number of Units	:	1 Nos. (1 SB)
Capacity	:	955 m^3/hr. @ Suitable mWC

Raw Sewage Transfer Pump 2

Number of Units	:	2 Nos. (1 W + 1 SB)
Capacity	:	220 m^3/hr. @ Suitable mWC

Raw Sewage Transfer Pump 3

Number of Units	:	2 Nos. (2 W)
Capacity	:	435 m^3/hr. @ Suitable mWC

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

2.3 Primary treatment

2.3.1 Stilling Chamber

Stilling chamber is provided to receive the sewage from the rising main from Raw Sewage Sump. The objective of stilling chamber is to reduce the turbulence of flow for achieving better efficiency in screening.

Stilling Chamber

Design Flow	:	22.91 MLD
Number of Units	:	1 No.
Material of Construction	:	RCC

2.3.2 Mechanical Fine Screen Channels

Raw sewage from the stilling chamber flows by gravity into the Fine Screen Channels. The Mechanical Fine Screen having automatic mechanism to remove the floating and oversized material more than 5 mm size such as plastic, debris, paper and cloth rags which could foul the downstream units. These screenings mechanically collected over a conveyor Belt and conveyed through Chute to wheel barrow / trolley positioned at Ground Level. Mechanical screen operation will be controlled depending upon the head loss across screen which will be monitored by level transmitter provided in the screen channel. The one mechanical fine screen is provided as standby arrangement and will be taken in working during maintenance of screen. Sluice gates are provided at the upstream & downstream of screen channels to regulate the flow and to isolate them for maintenance.

Mechanical Fine Screen Channel

Design Flow	:	22.91 MLD
Number of Units	:	2 No. (1W+1S)
Material of Construction	:	RCC

Mechanical Fine Screen

Design Flow	:	Peak Flow
	:	22.91 MLD
Number of Units	:	2 No. (1W+1S)

2.3.3 Grit Separator Unit

The Screened Sewage flows by gravity into Grit Separator Unit. the Mechanical type grit scrapping device provided in the Grit chamber scrapes the settled grit to a side pocket from where it is lifted by classifier mechanism above the water level and dropped through a chute on platform or trolley. An organic return

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

pump is provided to send the return water collected in the pocket back into the main chamber. The grit is settled in the main chamber & after de-gritting the sewage overflows into the outlet channel. Sluice gate is provided at the upstream of Grit Chamber.

Grit Separator Unit

Design Flow	:	22.91 MLD
Number of Units	:	2 No. (1W+1S)
Material of Construction	:	RCC

2.4 Sequential Batch Reactors (C-Tech) units

Refer complete design and description of biological treatment process based on SBR (C-Tech) process for 10 MLD + centrate flow capacity provided in section 4.

2.5 Chlorination System (Gas Chlorination)

Treated sewage from SBR flows by gravity into Chlorine Contact Tank (CCT) through RCC Channel where chlorine is added for disinfection at suitable dosing rate to achieve the desired Faecal Coliform Standards. Baffle Walls are provided in the CCT to facilitate mixing of treated sewage. Adequate contact time is provided in the CCT to ensure proper disinfection of treated sewage. Weir is provided at outlet of the CCT.

Chlorine Contact Tank

Design Flow	:	Decant Flow
No. of Units	:	1 No.
Chlorine Dosage	:	5 PPM

Chlorination System

Design Flow	:	Decant Flow
Number of Chlorinators	:	2 No.(1W + 1SB)

Service Water Pumps

Design Flow	:	10 m^3/hr
No. of Units	:	2 No. (1 W + 1 SB)

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

2.6 Treated Water Storage and distribution system

After the chlorination system, treated sewage is transferred to the underground storage tank. The underground storage tank is provided with pumps to transfer treated sewage to Elevated Storage Reservoir (ESR). The treated sewage is then used from ESR for gardening, cleaning of equipment, flushing of pipelines and other uses.

2.7 Sludge Dewatering Units

2.7.1 Sludge Sump and Sludge Transfer Pumps

Sludge generated from SBR is collected into sludge sump. Sludge sump shall be equipped with one working blower for sludge mixing. The sludge from sludge sump is pumped to Mechanical Dewatering Device with the help of sludge transferring pumps.

Sludge Sump

Design Flow	:	Sludge Generated from SBR
Quantity	:	1 No.
Material of Construction	:	RCC

Sludge Sump Air Blowers

Type	:	Twin / Tri Lobe Blowers
Quantity	:	2 Nos. (1W + 1S)

Sludge Transfer (Centrifuge Feed) Pumps

Type	:	Positive Displacement Screw Type
Quantity	:	2 Nos. (1W + 1SB)

2.7.2 Mechanical Sludge Dewatering Device (Centrifuge)

Two numbers (1W + 1SB) of Mechanical Dewatering Device are provided to dewater the sludge. Biological Sludge from Sludge Sump is fed to Mechanical Dewatering Device for dewatering to the required consistency so that it can be easily disposed of. The centrate from Sludge Dewatering Machine recycled back to plant inlet. Polyelectrolyte is dosed online at the inlet of Dewatering Unit to enhance sludge dewatering efficiency.

The dewatering system is located at first floor so that the de-watered sludge can directly collect into trolleys/ drums/ bins without use of any material handling unit. Polyelectrolyte is dosed online at

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

Dewatering Unit inlet with dosage of is 2.5 Kg / Ton of dry solids in sludge at 0.1% solution strength. Two numbers (1W + 1SB) of Polyelectrolyte Dosing Tanks are provided. Each Tank is equipped with Slow Speed Mixer to prepare Polyelectrolyte solution. The solution is fed to Dewatering Unit using Positive Displacement Type Dosing Pumps. There are dedicated Dosing Pumps provided to each Sludge Dewatering machines. The Pumps are interlocked with Mechanical Dewatering Device.

Sludge dewatering unit

Quantity : 2 Nos. (1W + 1SB)

Polyelectrolyte Dosing Tank:

No. Polymer Dosing Tanks : 2 Nos

Material of Construction : RCC

Polymer Dosing Tank Agitator:

No. of Agitator : 2 no. / tank

Polymer Dosing Pump:

No. Polymer Dosing Pumps : 2 Nos. (1W + 1SB)

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

SECTION-3

DESIGN CALCULATIONS

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

3. PROCESS DESIGN CALCULATIONS

PROCESS DESIGN CALCULATIONS FOR 10 MLD CAPACITY PUMPING STATION

3.2.1 RECEIVING CHAMBER

No. of Units	=	**1**	No.
Design Flow	=	Peak Flow	
Peak Flow	=	56.64	MLD
	=	2360.00	m^3/h
	=	0.656	m^3/s
Hydraulic Retention Time (HRT) at Peak Flow	=	60	sec
Volume required	=	0.656 x 60	
	=	39.36	m^3
Considering depth of chamber	=	**1.30**	m
Area of chamber	=	30.28	m^2
Width of Chamber	=	**5.00**	m
Length of Chamber	=	**6.50**	m
Freeboard provided	=	**0.50**	m
Volume provided	=	42.25	m^3

1 No. of Receiving Chamber of size 6.5 m L x 5 m W x 1.3 m SWD + 0.5 m FB shall be provided.

3.2.2 COARSE SCREEN CHANNELS

No. of Mechanical (Working) Screens	=	1	Nos.
No. of Mechanical (Standby) Screens	=	1	Nos.
Total No. of Screens	=	2	Nos.

The civil unit of screen channels are designed for ultimate average flow of 25.40 MLD and associated peak flow.

COARSE SCREEN CHANNELS: MECHANICAL

No. of Mechanical Screens	=	**1**	Nos.
Design Flow	=	Peak Flow	
	=	56.64	MLD
	=	2360.00	m^3/hr
	=	0.656	m^3/sec
Average Flow	=	25.40	MLD
	=	1058.33	m^3/hr
	=	0.294	m^3/sec
Design Flow in each Screen	=	$\frac{0.656}{1}$	m^3/sec No.

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

	=	0.656	m^3/sec
Average Flow in each Screen	=	0.294 / 1	m^3/sec / No.
	=	0.294	m^3/sec
Maximum Velocity through Screen at Peak Flow	=	1.10	m/sec
Minimum Velocity through Screen at Average Flow	=	0.60	m/sec
Clear Area of Opening through Screen at Peak Flow	=	0.656 / 1.10	m^3/sec / m/sec
	=	0.596	m^2
Clear Area of Opening through Screen at Average Flow	=	0.294 / 0.6	m^3/sec / m/sec
	=	0.490	m^2
Considering maximum Area of Opening through Screen	=	0.596	m^2
Clear Spacing of Bars	=	20	mm
Thickness of Bars	=	10	mm
Gross Area of Screen	=	0.596 x (20+10) / 20	
	=	0.89	m^2
Assuming Depth of Screen Channel	=	0.90	m
Gross Width of Screen	=	0.895 / 0.9	
	=	0.994	m
No. of Bars	=	(Gross Width of Screen / Centre to Centre Spacing of Bars) - 1	
	=	(0.994 / ((20 + 10)/1000) - 1	
	=	32.13	Nos.
Say	=	33	Nos.
Width of Screen provided	=	(Number of Bars+1) x Clear Spacing + (Number of Bars x Bar Thickness)	
	=	(33+1) x 20 + (33 x 10)	
	=	1010	mm
Say	=	**1050**	mm
Width of Side Frame provided	=	75	mm
Width of Screen Channel provided	=	**1200**	mm

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

Height of Blind Plate at Bottom of Screen provided	=	50	mm
Liquid Depth of Screen Channel provided	=	**950**	mm
Length of Screen Channel provided	=	**8000**	mm
Freeboard provided	=	**500**	mm

Head Loss across Screen

Head Loss across Screen	=	$0.0728 (V^2 - v^2)$	
V = Velocity through Screen at Peak Flow	=	Peak Flow through Screen Channel / Clear Area of Opening through Screen	
	=	1.041	
v = Velocity in approach Channel at Peak Flow	=	Peak Flow through Screen Channel / Cross Sectional Area of Screen Channel	
	=	0.58	
Head Loss across Screen at Peak Flow	=	0.055	

Head Loss across Screen at 50% Clogged Condition

Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.083	
Head Loss across screen at 50% Clogged Condition at Peak Flow	=	0.292	
	<	0.300	m

Screen channel of size 8.0 m L x 1.2 m W x 0.95 m SWD and 0.5 m FB shall be provided.

3.2.4 RAW SEWAGE SUMP (WET WELL) OF RAW SEWAGE PUMPING STATION

No. of Units	=	1 No.	
Design Flow	=	Average Flow + Recycle Flow	
	=	25.40	MLD
	=	1058.33	m^3/hr
	=	0.294	m^3/sec
Hydraulic Retention Time (HRT) at Ultimate Average Flow	=	20	min
Volume required	=	Design flow x HRT	
		0.294 X 20 / 60	
	=	352.80	m^3
Hydraulic Retention Time (HRT) at Ultimate Peak Flow	=	Volume / Ultimate Peak Flow	

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

	=	9.0	min
Side Water Depth (SWD) provided	=	**2.5**	m
Plan Area of Wet Well	=	352.8/2.5	m^2
	=	141.1	m^2
Diameter of sump required	=	13.40	m
Diameter of sump provided	=	**13.5**	**m**

1 No. of Raw Sewage Sump of size 13.5 m Dia. x 2.5 m SWD + Suitable FB shall be provided.

RAW SEWAGE TRANSFER PUMPS

Average Flow	=	433.75	m^3/h
Peak Flow	=	954.58	m^3/h

Pump Capacity provided

As per Tender, Section B. Primary Treatment, Subsection Raw Sewage Sump and Pump, 'Submersible Sewage Pumps" Page No. 109

Raw Sewage Transfer Pumps 1

No. of Working Pumps	=	2	Nos
No. of Standby Pumps	=	2	Nos
Capacity	=	**220**	m^3/h

Raw Sewage Transfer Pumps 2

No. of Working Pumps	=	0	Nos
No. of Standby Pumps	=	1	Nos
Capacity	=	**955**	m^3/h

Raw Sewage Transfer Pumps 3

No. of Working Pumps	=	2	Nos
No. of Standby Pumps	=	0	Nos
Capacity	=	**435**	m^3/h

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

PROCESS DESIGN CALCULATIONS FOR 10 MLD SEWAGE TREATMENT PLANT

3.3.1 STILLING CHAMBER

No. of Units	=	**1**	No.
Design Flow	=	Peak Flow	
Peak Flow	=	22.91	MLD
	=	954.58	m^3/h
	=	0.265	m^3/s
Hydraulic Retention Time (HRT) at Peak Flow	=	30	s
Volume required	=	0.265 x 30	
	=	7.95	m^3
Side Water Depth (SWD) provided	=	**2.00**	m
Width provided	=	**2.10**	m
Length provided	=	**2.00**	m
Freeboard provided	=	**0.50**	m
Volume provided	=	8.40	m^3

1 No. of Inlet Chamber of size 2 m L x 2.1 m W x 2 m SWD + 0.5 m FB shall be provided.

3.3.2 FINE SCREEN CHANNELS

No. of Mechanical (Working) Screens	=	1	Nos.
No. of Mechanical (Standby) Screens	=	1	Nos.
Total No. of Screens	=	2	Nos.

FINE SCREEN CHANNELS: MECHANICAL

No. of Mechanical Screens	=	Peak Flow	Nos.
Design Flow	=	22.910	
	=	22910	MLD
	=	958.00	m^3/hr
	=	0.266	m^3/sec
Average Flow	=	10.41	MLD
	=	433.75	m^3/hr
	=	0.120	m^3/sec
Design Flow in each Screen	=	$\frac{0.266}{1}$	m^3/sec No.
	=	0.266	m^3/sec
Average Flow in each Screen	=	$\frac{0.120}{1}$	m^3/sec No.

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

	=	0.120	m^3/sec
Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
Clear Area of Opening through Screen at Peak Flow	=	0.265	m^3/sec
		1.2	m/sec
	=	0.221	m^2
Clear Area of Opening through Screen at Average Flow	=	0.120	m^3/sec
		0.6	m/sec
	=	0.201	m^2
Considering maximum Area of Opening through Screen	=	0.222	m^2
Clear Spacing of Bars	=	5	mm
Thickness of Bars	=	3	mm
Gross Area of Screen	=	0.222 x (5+3) / 5	
	=	0.355	m^2
Assuming Depth of Screen Channel	=	0.6	m
Gross Width of Screen	=	0.355 / 0.6	
	=	0.591	m
No. of Bars	=	(Gross Width of Screen / Centre to Centre Spacing of Bars) - 1	
	=	(0.591 / ((5 + 3)/1000) - 1	
	=	72.92	Nos.
Say	=	80	Nos.
Width of Screen provided	=	(Number of Bars+1) x Clear Spacing + (Number of Bars x Bar Thickness)	
	=	(80+1) x 5 + (80 x 3)	
	=	645	mm
Say	=	**700**	mm
Width of Side Frame provided	=	75	mm
Width of Screen Channel provided	=	**850**	mm
Height of Blind Plate at Bottom of Screen provided	=	50	mm

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

Liquid Depth of Screen Channel provided	=	**650**	mm
Length of Screen Channel provided	=	**8500**	mm
Free board provided	=	**500**	mm
Head Loss across Screen			
Head Loss across Screen	=	$0.0728 (V^2 - v^2)$	
V = Velocity through Screen at Peak Flow	=	Peak Flow through Screen Channel / Clear Area of Opening through Screen	
	=	1.014	
v = Velocity in approach Channel at Peak Flow	=	Peak Flow through Screen Channel / Cross Sectional Area of Screen Channel	
	=	0.482	
Head Loss across Screen at Peak Flow	=	0.058	
Head Loss across Screen at 50% Clogged Condition			
Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.028	
Head Loss across screen at 50% Clogged Condition at Peak Flow	=	0.282	
	<	**0.300**	m

1 No. Working and 1 No. Standby of Mechanical Fine Screen Channels: of size 8.50 m L x 0.85 m W x 0.65 m SWD + 0.5 m FB shall be provided.

3.3.3 GRIT CHAMBERS

No. of Working Units	=	1	Mechanical
No. of Standby Units	=	1	Mechanical
Total No. of Units	=	2	Nos

GRIT CHAMBER: MECHANICAL

No. of Mechanical Grit Chamber	=	**1**	
Design Flow	=	Peak Flow	
Peak Flow	=	22.910	MLD
	=	22910	m^3/day
	=	954.58	m^3/hr
	=	0.265	m^3/sec
Design Flow to each Grit Chamber	=	22910 / 1	
	=	22910	m^3/day
	=	954.58	m^3/hr
	=	0.265	m^3/sec
Surface Overflow Rate for 0.1 mm dia. Particle Size with Specific Gravity Ss > 2.65 considering	=	1555	m^3/m^2/day

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End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

100% removal efficiency in an ideal Grit Chamber (Vs)			
Considering Design Overflow Rate	=	960	$m^3/m^2/day$
Area of Grit Chamber required	=	22910 / 960	m^2/day / $m^3/m^2/day$
	=	23.86	m^2
Square Side of Grit Chamber required	=	√ 23.86	
	=	4.89	m
Length of Chamber provided	=	**5.00**	m
Width of Chamber provided	=	**5.00**	m
HRT in Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber required	=	0.266 x 60	
	=	15.97	m^3
Depth required in Grit Chamber	=	15.97 / (5 x 5)	
	=	0.64	m
Say	=	0.65	m
Grit Storage Depth	=	0.25	m
Total Liquid Depth required	=	0.90	m
Total Liquid Depth provided	=	**0.90**	m
Freeboard provided	=	**0.50**	m

Grit Chamber of size 5 m L x 5 m W x 0.9 m SWD and 0.5m freeboard shall be provided.

3.3.4 PARSHALL FLUME

Design Flow	=	Peak Flow	
	=	22.910	MLD
	=	958.000	m^3/hr
	=	266	lps
Discharge through Parshall Flume, $Q = 2264 * W * (H_A)^{3/2}$			
Where, Q	=	266	lps
Considering Throat Width, W	=	0.45	m
Depth of Water in upstream of Throat (H_A)	=	0.409	m
Say	=	**0.410**	m

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End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

Considering Submergence Ratio	=	60%	
Depth of Water in downstream of Throat (H_B)	=	Submergence Ratio x H_A	m
	=	0.245	m
Say	=	**0.250**	m
Length of Channel in the Upstream leg of the Parshall Flume = 10 * W	=	4.500	m
Say	=	**4.500**	m
Length of Channel in the Downstream leg of the Parshall Flume = 5 * W	=	2.250	m
Say	=	**2.300**	m
Overall Length of Channel	=	8.300	m
Say	=	**8.500**	m
Head Loss across Parshall Flume	=	0.160	m
Say	=	**0.200**	m

3.4 SEQUENTIAL BATCH REACTOR

Refer complete design and description of biological treatment process based on SBR (C-Tech) process for 10 MLD capacity SEWAGE TREATMENT PLANT (STP) provided separately.

3.5 DISINFECTION SYSTEM

3.5.1 CHLORINE CONTACT TANK

No. of Units	=	1	No.
Design Flow	=	Average Flow or Decant Flow whichever is more	
Average Flow	=	416.7	m^3/h
Decant Flow	=	625.0	m^3/h
Hydraulic Retention Time at Average Flow	=	30	min
Volume of Chlorination Tank required	=	625 x 30 / 60	
	=	312.5	m^3
Provide volume of Chlorine Contact Tank	=	315.0	
As per tender total capacity of CCT + UGR required	=	1500.0	kl
As per tender total capacity of TGR provided	=	1185.0	kl
Side Water Depth (SWD) provided	=	**2.60**	m
Width provided	=	**4.20**	m
SBR basin size (Dia.)	=	43.3	m

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

Assuming thickness of SBR basin wall	=	0.6	m
The outer diameter of SBR basin	=	44.5	m
The diameter provided for CCT + UGR	=	52.9	m
Total Area available for CCT + UGR	=	643.00	m^2
Area provided for CCT=Volume/SWD	=	315.00 / 2.6	m^2
Area provided for CCT	=	125.0	m^2
Area available for UGR	=	518.00	m^2
Side Water Depth (SWD) provided for UGR	=	2.40	m
Volume provided for UGR=Area x SWD	=	518.00 x 2.4	m^3
	=	**1243.20**	m^3
Total Volume provided for CCT + UGR	=	**1568.2**	m^3
Freeboard provided (min)	=	**0.50**	m

3.5.2 CHLORINATORS

Design Flow		Average Flow or Decant Flow whichever is more	
Average Flow	=	417	m^3/hr
Decant Flow	=	625.01	m^3/hr
Design Chlorine Dosage (Max)	=	5	mg/l
Quantity of Chlorine required	=	625 x 5 / 1000	
	=	3.20	Kg/hr
No. of Working Chlorinator provided	=	**1**	No.
Capacity of Chlorinator required	=	3.20	Kg/hr
Capacity of Chlorinator provided	=	**4**	Kg/hr
No. of Standby Chlorinator provided	=	**1**	No.
Quantity of Chlorine required	=	625 X 24 x 10/1000	
	=	75	Kg/day
Considering Storage Period as	=	15	days
Quantity of Chlorine required	=	75.001 x 15	
	=	1125	Kg
Available Capacity of one Chlorine Tonner	=	928	Kg
No. of Chlorine Tonners required	=	1125.009 / 928	
	=	1.21	Nos.
Say	=	**2**	Nos.
No. of Chlorine Tonners in use at any time	=	**1**	Nos.
Total No. of Chlorine Tonners provided	=	**2**	Nos.

Two(2) number of Chlorinator shall be provided

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

3.5.3 TREATED WATER TRANSFER PUMPS

Design Flow	=	10000	m^3 /d
	=	416.7	m^3/hr
No. of Working Pumps	=	1	Nos
Capacity of Each Pump Required	=	420.0	m^3/hr
Pump Capacity provided			
2 Nos. (1W+1SB)	=	**420.0**	**m^3/hr**
No. of Working Pumps	=	**1**	No.
No. of Standby Pumps	=	**1**	No.

3.5.4 OVERHEAD/ELEVATED SERVICE RESERVOIR

No. of Units	=	**1**	No.
Volume of ESR as per tender	=	0.50	ML
	=	500.00	m^3
Area	=	166.67	
Dia. required	=	14.57	
Dia. provided	=	**14.60**	m
Side Water Depth (SWD)	=	**3.00**	m

3.6 SLUDGE HANDLING SYSTEM

3.6.1 BIOLOGICAL SLUDGE SUMP

Biological Sludge to be wasted from SBR	=	3563	Kg/day
Solids Consistency of Waste Sludge considered	=	0.80%	
Volume of Sludge to be wasted in a day	=	3563 / (0.008 x 1000 X 1.05)	
	=	424	m^3/day
	=	17.67	m^3/hr
HRT provided in Sludge Sump	=	6.00	hrs
Volume of Sludge Sump required	=	17.67 x 6	
	=	106.00	m^3
Side Water Depth (SWD) provided	=	**2.60**	m
Width provided	=	**7.00**	m
Length provided	=	**6.00**	m
Volume provided	=	109.20	m^3
Freeboard provided	=	**0.50**	m

Biological Sludge Sump of size 6.0 m L x 5.5 m W x 2.8 m SWD is provided.

3.6.2 SLUDGE SUMP MIXERS

Volume of Sludge Sump	=	109.20	m^3

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

Mixing requirement	=	0.025	KW/m^3
No. of Mixers Provided	=	**1**	Nos.
Kw rating of Submersible Mixer Required	=	2.34	KW
Kw rating of Submersible Mixer Provided	=	3.00	KW

3.6.3 SLUDGE DEWATERING UNIT & FEED PUMPS

Sludge to Centrifuge in a day	=	424	m^3/d
No. of Operating Hours of Centrifuge considered	=	18.00	hr/d
Capacity of Centrifuge required	=	23.60	m^3/h
No. of Working Centrifuge considered	=	**1**	Nos.
Capacity of each Centrifuge required	=	23.60	m^3/h
Capacity of each Centrifuge provided	=	**24.00**	m^3/h
No. of Standby Centrifuge provided	=	**1**	No.
Capacity of Centrifuge Feed Pump provided	=	**24.00**	m^3/h
No. of Working Centrifuge Feed Pump provided	=	**1**	Nos.
No. of Standby Centrifuge Feed Pump provided	=	**1**	No.
Head provided	=	**25**	mWC

3.6.4 POLYELECTROLYTE DOSING SYSTEM

Quantity of Sludge to be dewatered in a day	=	3563	Kg/day
Design Polyelectrolyte Dosage (Max)	=	2.50	Kg/Ton of Dry Solids
Quantity of Polyelectrolyte required	=	8.91	Kg/day
Design Strength of Polyelectrolyte Solution	=	0.1%	
Volume of Polyelectrolyte Solution	=	8.91 / (0.001 x 1000)	
	=	8.90	m^3
No. of Dosing Tanks provided	=	**2**	Nos.
Volume of each Dosing Tank required	=	4.46	m^3
Side Water Depth (SWD) provided	=	**1.20**	m
Length/Width required	=	1.93	m
Length/Width offered	=	**2.00**	m
Volume provided	=	4.80	m^3
Freeboard provided	=	**0.50**	m

2 No. of Polyelectrolyte Dosing System of size 2.0 m L x 2.0 m W x 1.2 m SWD + 0.5 m FB shall be provided.

No. of Working Poly Dosing Pump provided	=	1	Nos.
Capacity of each Poly Dosing Pump required	=	Total Volume of Polyelectrolyte Solution / (No. of Dosing Pumps x No. of Hours of Operation of Centrifuge)	

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

	=	8.91 / (1 x 18)	
	=	0.495	m^3/hr
	=	495	LPH
Capacity of each Poly Dosing Pump provided	=	**700**	LPH
No. of Standby Poly Dosing Pump provided	=	**1**	No.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

SECTION-4

BASIC ENGINEERING PACKAGE FOR SBR (ATTACHED SEPARATELY)

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

SECTION – 5

HYDRAULIC CALCULATIONS

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

HYDRAULIC CALCULATIONS: 10 MLD MPS AT KOTPUTLI, RAJASTHAN

SL NO	INPUT PARAMETERS			
1	Total Average Flow	=	25.40	MLD
		=	1058.33	m^3/hr
		=	0.294	m^3/sec
2	Peak Factor	=	2.25	
3	Peak Flow	=	56.64	MLD
		=	2360.00	m^3/hr
		=	0.656	m^3/sec
4	Invert Level of incoming Sewer	=	346.500	m
5	Finished Ground Level	=	349.200	m
1	**Invert Level (IL) of incoming sewer**	**=**	**346.400**	**m**
	Free Fall into inlet chamber	=	200	mm
2	**Water Level in Receiving Chamber**	**=**	**346.300**	**m**
	SD in Receiving Chamber	=	**1.3**	**m**
	Invert Level of Receiving Chamber	=	**345.00**	**m**
	Entry Losses through Inlet Sluice Gate of coarse Screen Channel			
	Peak Flow	=	2360.00	m^3/hr
	Design Velocity in Channel	=	1.2	m/sec
	C/s Area of Channel, m2	=	0.55	m^2
	Width of channel/gate	=	950	mm
	SWD in Channel	=	950	mm
	Actual Velocity in Channel (V)	=	0.73	m/sec
	Head Loss across the sluice gate	=	(kxV^2)/(2g)	
	g	=	9.81	m/sec^2
	k value	=	0.5	
	Nos	=	1	
	Head Loss	=	(0.5x0.73x0.73)/(2x9.81)	
		=	13.58	mm
	Total Head Loss	=	**14**	**mm**
	Margin	=	**36**	**mm**
	Total Headloss	=	**50**	**mm**

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

3	**Water Level in Upstream of Coarse Screen Channel**	=	**346.250**	**m**
	SWD in Coarse Screen Channel	=	**0.950**	**m**
	Invert Level of Screen Channel	=	**345.300**	**m**
	Considering Headloss across Coarse screens	=	300	mm
4	**Water Level in Downstream of Coarse Screen Channel**	=	**345.950**	**m**
	SWD in Coarse Screen Channel	=	**0.950**	**m**
	Invert Level of Screen Channel	=	**345.000**	**m**
	Free Fall into wet well	=	100	mm
5	**Water Level in Wet Well**	=	**344.900**	**m**
	SWD in Wet Well	=	**2.500**	**m**
	Invert Level of Wet Well	=	**342.400**	**m**

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

HYDRAULIC CALCULATIONS: 10 MLD STP AT KOTPUTLI, RAJASTHAN

SL NO	INPUT PARAMETERS			
1	Average Flow	=	10.00	MLD
		=	416.67	m^3/h
	Other Flow	=	0.41	MLD
		=	16.67	m^3/h
	Total Average Flow	=	10.40	MLD
		=	433.33	m^3/h
2	Peak Factor	=	2.25	
3	Peak flow	=	22.50	MLD
		=	937.50	m^3/h
	Total Peak Flow	=	22.91	MLD
		=	954.58	m^3/h
	Fill Time (FA)	=	1.500	hrs
	Decant Time (D)	=	1.000	hrs
	No. of Basins in FA	=	1.00	Nos.
	No. of Basins in D	=	1.00	Nos.
	Decant Flow	=	Avg. Flow X FA x No. of Basin in Decant	
4	Decant Flow	=	625.00	m^3/h
5	NGL (Natural Ground Level)	=	349.000	m
6	FGL (Finished Ground Level)	=	349.200	m
1.0	**Water Level in CCT cum underground reservoir outlet**	=	**350.400**	**m**

1.0 Head Loss from Chlorine Contact Tank Outlet to Chlorine Contact Tank Inlet

1.1 Head of Water over Weir

Discharge over Rectangular Weir (Q)	=	2/3*Cd*b*sqrt(2*9.81)*H^(3/2)	
Length of Weir, b (m)	=	4.20	m
Coefficient of Discharge, C_d	=	0.6	
Head of Water over Weir, H (m)	=	(0.174/(2/3x0.6x4.2x(2x9.81) ^(1/2))^2/3	
	=	0.08	m

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

		=	**82**	**mm**
1.2	**Free Fall**	=	**100**	**mm**
1.3	**Margin**	=	**18**	**mm**
1.4	**Total Head Loss**	=	**200**	**mm**
1.5	**Water Level in CCT**	=	**350.600**	**m**
	SWD in CCT	=	**2.600**	**m**
	Invert Level of CCT	=	**348.000**	**m**

2.0 Head Loss from CCT Inlet To High Point of SBR

2.1 Head Losses in SBR Outlet Channel as per Manning Formula

Pressure Drop through Open Channel (m)	=	(((nxV)/(R^2/3))^2)xL	
Flow	=	625.10	m^3/h
Design Velocity in Channel	=	0.80	m/s
C/s Area of Channel	=	0.22	m^2
Width of channel	=	500.00	mm
SWD in Channel	=	450	mm
Actual Velocity in Channel (V)	=	0.770	m/s
Wetted Perimeter	=	2 x (450/1000) + (500/1000)	
	=	1.40	m
Hydraulic Radius (R)	=	(0.152/1.2)	
	=	0.16	m
Roughness Coefficient (n)	=	0.017	m
Length	=	10.00	m
Headloss	=	(((0.017x0.77)/(0.16^2/3))^2)x10	
	=	0.020	m
	=	**20**	**mm**

2.2 Exit Losses from channel

Pressure Drop through Pipe Exit	=	(kxV^2)/(2g)	
Velocity through opening	=	0.8	m/sec
k value	=	1	
g	=	9.81	
Nos	=	1	
Head Loss	=	(1x0.77x0.77) /(2x9.81)	
		0.03	m
		31.00	**mm**

2.3 Margin = **49** **mm**

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

2.4	**Total Head Loss**	=	**100**	**mm**
2.5	**Water Level in SBR Outlet Channel (H.P.)**	=	**350.700**	**m**
3.0	**Head Loss from SBR outlet to SBR Top water level**			
3.1	Decanter Downcomer Drop	=	900	mm
3.2	Distance between Centre of Decanter Shaft and bottom of Pipe	=	300	mm
3.3	Free Fall into outlet Chamber	=	100	mm
3.4	**Bottom Water Level in SBR**	=	**352.000**	
3.5	Decanting Depth	=	2000.00	mm
4.0	**Maximum Water Ground Level in SBR Basins**	=	**354.000**	**m**
	SWD in SBR basin	=	**6.000**	**m**
	Invert Level of Ground Level SBR Basins	=	**348.000**	**m**
4.1	**Head Loss at SBR inlet**			
	Flow (Peak)	=	954.58	m^3/h
	Velocity in Channel	=	1.2	m/s
4.2	**Free Fall Into Selectors**	=	**100**	**mm**
4.3	**Exit Losses from channel to Selectors through Inlet Sluice Gate**			
	Pressure drop through sluice gate	=	k*(V*V/(2*9.81))	
	k	=	1	
	Nos	=	1	
	Headloss	=	73.39	mm
		=	**74.00**	**mm**
4.4	**Margin**	=	**26**	**mm**
4.5	**Total Head Loss**	=	**200**	**mm**
4.6	**Water Level at C-Tech Inlet Gate**	=	**354.200**	**M**
	SWD in Channel	=	**550.000**	**mm**
	Invert Level Inlet Channel	=	**353.650**	**M**
5.0	**Water Level in downstream of Parshall flume**	=	**354.250**	**m**

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

	Headloss Across Parshall Flume	=	300.00	mm
6.0	**Water Level in Outlet of Grit Chambers**	=	**354.550**	**m**
7.0	**Head loss from Grit Chamber Outlet To Grit Chamber**			
7.1	**Head of Water over Weir**			
	No of working Grit Chamber	=	1	
	Discharge over Rectangular Weir (Q)	=	2/3*Cd*b*sqrt(2*9.81)*H^(3/2)	
	Length of Weir, b (m)	=	5.00	m
	Coefficient of Discharge, C_d	=	0.6	
	Head of Water over Weir, H (m)	=	(954.58/1/3600)/(2/3x0.6x5x(2x9.81)^1/2)^2/3	
		=	0.10	m
		=	**97**	**mm**
7.2	**Free Fall into Outlet Launder**	=	**100**	**mm**
7.3	**Margin**	=	**3**	**mm**
7.4	**Total Head Loss**	=	**200**	**mm**
7.5	**Water Level in Grit Chambers**	=	**354.750**	**M**
	SWD in Grit Chamber	=	**0.900**	**M**
	Invert Level of Grit Chamber	=	**353.850**	**M**
8.0	**Headloss through inlet channel to grit chamber**			
8.1	**Entry Losses through Inlet Sluice Gate: Grit Chamber**			
	No. of Grit Chamber Operating	=	1	Nos.
	Flow	=	954.58	m^3/h
	Design Velocity in Channel	=	0.9	m/s
	C/s Area of Channel, m2	=	0.29	m^2
	Width of channel	=	850.00	mm
	SWD in Channel	=	600.00	mm
	Actual Velocity in Channel (V)	=	0.52	m/s
	Head Loss across the sluice gate	=	(kxV^2)/(2g)	
	g	=	9.81	m/s^2
	k value	=	0.5	
	Nos	=	1	
	Head Loss	=	(0.5x0.52x0.52)/(2x9.81)	
		=	6.89	mm
	Total Head Loss	=	**7.00**	**mm**

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Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

8.2	**Margin**	=	**43**	**mm**
8.3	**Water Level at Grit Chambers inlet**	=	**354.800**	**m**
9.0	**Head Loss from Grit Chamber Inlet to Fine Screen Downstream**			
9.1	**Head Loss across the sluice gate**			
	Flow	=	954.58	m^3/h
	Design Velocity in Channel	=	1	m/s
	C/s Area of Channel, m2	=	0.27	m^2
	Width of channel	=	850.00	mm
	SWD in Channel	=	650.00	mm
	Actual Velocity in Channel (V)	=	0.48	m/s
	Head Loss across the sluice gate	=	(kxV^2)/(2g)	
	g	=	9.81	m/sec^2
	k value	=	1	
	Nos	=	1	
	Head Loss	=	(1x0.48x0.48) /(2x9.81)	
		=	11.74	mm
		=	**12**	**mm**
9.2	**Margin**	=	**38**	**mm**
9.3	**Total Headloss**	=	**50**	**mm**
9.4	**Water Level in downstream of Screen**	=	**354.850**	**m**
	SWD in Fine Screen	=	**0.650**	**m**
	Invert Level of Fine Screen	=	**354.200**	**m**
10.0	**Head loss from Fine Screen Outlet to Fine Screen Inlet**			
10.1	**Considering Headloss across fine screens**	=	**300**	**mm**
10.2	**Water Level in upstream of Screen**	=	**355.150**	**m**
	SWD in Fine Screen	=	**0.650**	**m**
	Invert Level of Fine Screen	=	**354.500**	**m**
11.0	**Head loss from Fine Screen inlet to Inlet Chamber**			
12.1	**Entry Losses through Inlet Sluice Gate**	=		
	Flow	=	954.58	m^3/hr
	Design Velocity in Channel	=	0.9	m/sec

Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

	C/s Area of Channel, m2	=	0.29	m^2
	Width of channel	=	850.00	mm
	SWD in Channel	=	400.00	mm
	Actual Velocity in Channel (V)	=	0.78	m/sec
	Head Loss across the sluice gate	=	(kxV^2)/(2g)	
	g	=	9.81	m/sec^2
	k value	=	0.5	
	Nos	=	1	
	Head Loss	=	(0.5x0.78x0.78)/(2x9.81)	
		=	15.50	mm
	Total Head Loss	=	**16.00**	**mm**
12.2	**Margin**	=	**34**	**mm**
12.3	**Total Headloss**	=	**50**	**mm**
13.0	**Water Level in Inlet Chamber**	=	**355.200**	**m**
	SWD in Inlet Chamber	=	**2.000**	**m**
	Invert Level of Inlet Chamber	=	**353.200**	**m**

Technocraft Construction Pvt. Ltd.

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Note: Hydraulics shall be finalised based on final pipe routing of the disposal line.

Description		Formula
1) Pressure drop through pipe (m)	=	((6.815*(V/C)^1.852*(1/(ID/1000))^1.167)*LENGTH OF PIPE
2) Pressure drop through bend(m)	=	K*(V*V/(2*9.81))
3) Pressure drop through sudden enlargement (m)	=	((V1^2-V2^2)/(2*9.81))
4) Discharge over rectangular weir, q	=	2/3.Cd.b.sqrt(2*9.81).H^(3/2)
5) Velocity through open channel, v	=	1/n*R^(2/3)*(hL/L)^0.5
6) Exit losses	=	K*(V*V/(2*9.81))
7) Entry losses	=	K*(V*V/(2*9.81))

NOMECLATURE	
ID -inside diameter of pipe in mm	b - length of weir
Q - flow in $m^3/hr.$	H - depth of water over weir
V - velocity in m/sec.	n - manning's coefficient
V1 - velocity in smaller diameter in m/sec.	R - hydraulic mean radius
V2 - velocity in bigger diameter in m/sec.	h_L - head loss through open channel
K - coefficient of friction	C_d - coefficient of discharge
C - Hazen-Williams coefficient	

(Y.P. MATHUR)
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Technocraft Construction Pvt. Ltd.

Project	Design, Supply, Construction, Installation, and Commissioning of 10 MLD capacity Main Pumping Station & Sewage treatment plant at Kotputli, Rajasthan.
End User	Municipal Council Kotputli, Rajasthan
Document Title	Basic Engineering Package for Sewage Treatment Plant (STP)

SECTION –6

DRAWINGS

Technocraft Construction Pvt. Ltd.

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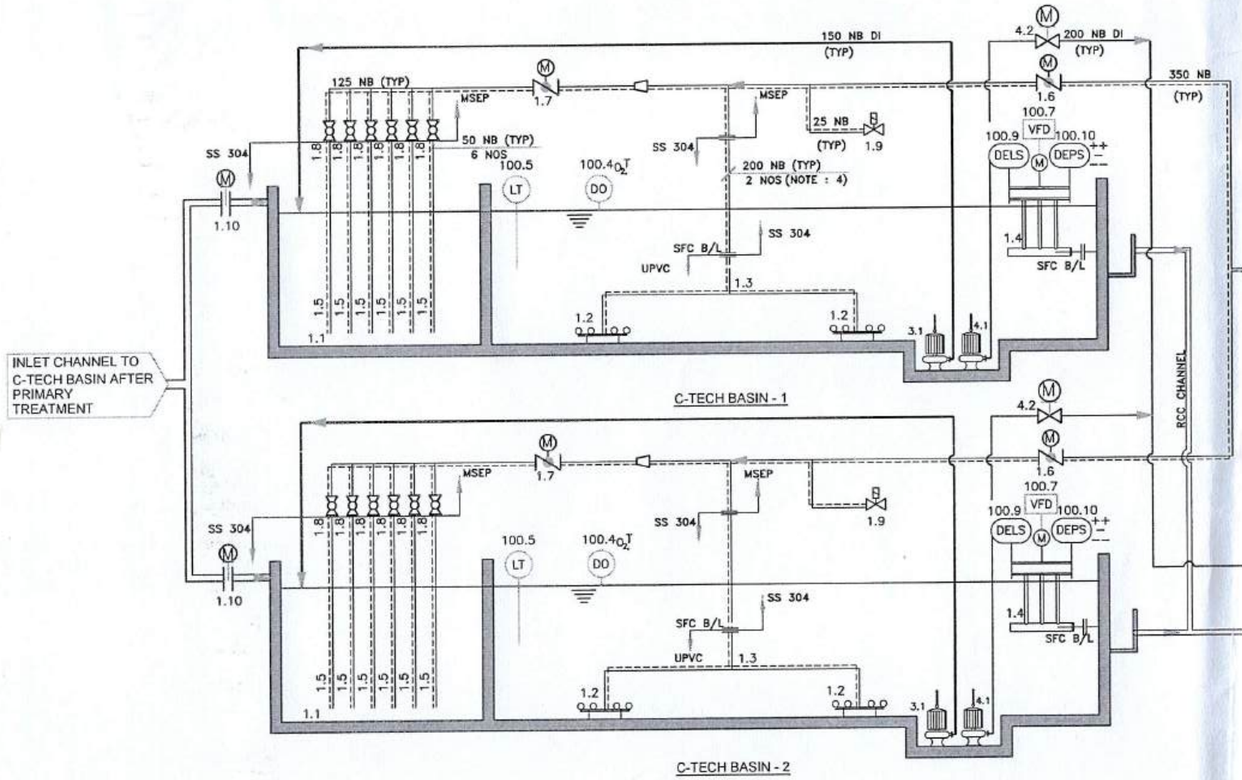

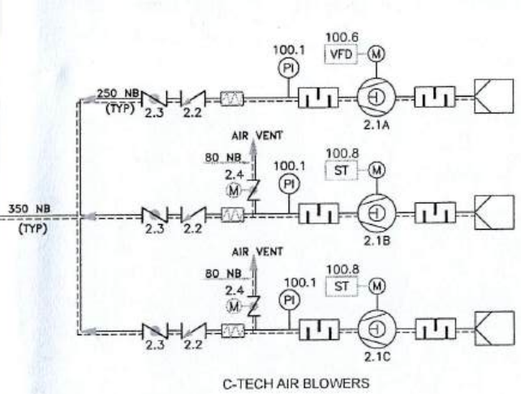

C-TECH AIR BLOWERS

EQUIPMENTS LIST						
MK.NO.	DESCRIPTION	SIZE/CAPACITY	QTY.	MOC.	REMARK	SCOPE
1.1	C-TECH BASINS 1/2	43300 DIA x 6000 SWD.	01	RCC	ONE CIRCULAR TANK WITH PARTITION	OTHERS
2.1A-C	C-TECH AIR BLOWERS	2550 Nm3/hr. @ 0.70 kg/cm2	03	CI	2W+1S	OTHERS
3.1	RETURN ACTIVATED SLUDGE PUMPS	110 m3/hr. @ 5.0 MAX MWC	03	CI	2W+1SS	OTHERS
4.1	SURPLUS ACTIVATED SLUDGE PUMPS	160 m3/hr. @ 10 MWC	03	CI	2W+1SS	OTHERS

MK.NO.	C-TECH INTERNAL ITEMS	QTY.	MOC	SCOPE
1.2	BASIN AIR DIFFUSERS	1 LOT	PU	SFC
1.3	BASIN AIR GRID LATERALS	1 LOT	UPVC	SFC
1.4	DECANTER	2 NOS.	SS 304	SFC
1.5	SELECTOR AIR PIPES	1 LOT	SS 304	OTHERS

VALVE SCHEDULE (OTHERS)								
MK.NO.	DESCRIPTION		SIZE	QTY.	MATL.	TYPE	OPERATION	END CONNECTION
1.6	C-TECH MAIN AIR LINE	ISOLATION	350	02	CI	BUTTERFLY	MOTORIZED	WAFER
1.7	SELECTOR MAIN AIR LINE	ISOLATION	125	02	CI	BUTTERFLY	MOTORIZED	WAFER
1.8	SELECTOR AIR GRID LINE	ISOLATION	50	12	CI	BALL	MANUAL	FLGD
1.9	C-TECH AIR HEADER	AIR VENT	25	02	SS	SOLENOID	ELECTRICAL	SCRD
1.10	C-TECH INLET	ISOLATION	550x550	02	CI	SLUICE GATE	MOTORISED	CH.MOUNTED
2.2	C-TECH AIR BLOWERS	NON-RETURN	250	03	CI	SWING CHECK	–	WAFER
2.3	C TECH AIR BLOWERS	DISCHARGE	250	03	CI	BUTTERFLY	MANUAL	WAFER
2.4	C TECH AIR	AIR VENT	80	02	CI	BUTTERFLY	MOTORISED	WAFER
4.2	SAS PUMP	DISCHARGE	200	02	CI	KNIFE GATE VALVE	MOTORISED	WAFER

INSTRUMENTS LIST					
MK.NO.		DESCRIPTION	QTY.	REMARK	SCOPE
PI	100.1	PRESSURE GAUGES	03	BOURDON TYPE WITH SNUBBER	OTHERS
DO	100.4	DISSOLVED OXYGEN METER	02	FIXED TYPE OPTICAL	OTHERS
LT	100.5	LEVEL TRANSMITTER	02	HYDROSTATIC TYPE	OTHERS
VFD	100.6	VARIABLE FREQUENCY DRIVE	01	BLOWERS	OTHERS
VFD	100.7	VARIABLE FREQUENCY DRIVE	02	FOR DECANTERS	SFC
ST	100.8	SOFT STARTER	02	BLOWERS	OTHERS
DELS	100.9	DECANTER LEVEL SENSOR	02	CAPACITIVE TYPE	SFC
DEPS	100.10	DECANTER POSITION SENSOR	2 SETS	MAGNETIC SWITCHES	SFC

LINE LEGEND	
	RAS LINE
	SAS LINE
	AIR LINE
	INSTRUMENT SIGNAL
	DRAIN LINE
	RCC CHANNEL
LEGEND	
	NON-RETURN VALVE
	BUTTERFLY VALVE
	MOTORIZED BUTTERFLY BUTTERFLY VALVE
	CHANNEL MOUNTED MOTORIZED GATE
	MOTORIZED GATE
	KNIFE GATE VALVE
	MOTORIZED KNIFE GATE VALVE
	BALL VALVE
VFD	VARIABLE FREQUENCY DRIVE
ST	SOFT STARTER
	MOTOR
	AIR BLOWER
	SILENCER
	FILTER

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ABBREVIATIONS:–

1. SFC B/L = BATTERY LIMIT OF SFC
2. W = WORKING
3. S = STANDBY
4. SS = STORE STANDBY

NOTES:

1) ALL DESIGN DETAILS, MOC, SPECIFICATIONS SHALL BE AS PER TENDER.
2) ALL AUTOMATIC VALVES, GATES, DRIVES & INSTRUMENTS SHALL INTERLOCKED WITH PLC.
3) DIFFUSERS LAYOUT & LATERAL PIPES GRID SHALL BE AS PER SFC DIFFUSERS GENERAL ARRANGEMENT DRAWING ONLY.
4) NUMBER & SIZE OF DOWNCOMER IS SUBJECTED TO CHANGE AS PER SFC C-TECH DIFFUSERS LAYOUT.

* HEAD TO BE DECIDED AS PER ACTUAL LOCATION OF SLUDGE SUMP & FINAL HYDRAULICS.

CLIENT: MUNCIPAL COUNCIL KOTPUTLI, RAJASTHAN

CONTRACTOR: M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.

PROJECT: 10 MLD SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI RAJASTHAN

TITLE: PIPING & INSTRUMENTATION DIAGRAM

(Y.P. MATHUR) Dy. Director (HAG) Civil Engg Department Institute of Technology Jaipur

Technocraft Construction Pvt. Ltd.

REV.NO	REVISION DESCRIPTION	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.

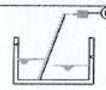
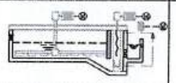
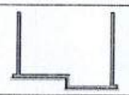
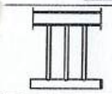
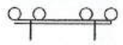
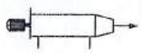
REFERENCE DRAWING NAME

	DATE	BY	SIGN
DRAWN	29-05-2024	SLJ/BRS	
DESIGNED	29-05-2024	YMM	
CHECKED	29-05-2024	YMM	
APPROVED	29-05-2024	SRP	
SCALE	NTS	PROJECTION:	

SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD.
ADVANCED TECHNOLOGIES WATER . WASTE WATER . SOLID WASTE . ENERGY
The Ambience Court, Hi-Tech Business Park
21st Floor, Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705, INDIA.

PROJ. CODE	DWG. SIZE	DWG. NO.	SHT.	REV.
D1065	A3	SFC/A3/D1065/01/01	01/01	R0

EQUIPMENT

	MECHANICAL COARSE/FINE SCREEN
	PARSHALL FLUME
	MECHANICAL GRIT CHAMBER
	BELT CONVEYOR
	TROLLY
	CIVIL TANK
	DECANTER
	DIFFUSER
	SILENCER
	FILTER
	SUBMERSIBLE PUMP
	AIR BLOWER
	AGITATORS
	CENTRIFUGE
	DOSING PUMP
	DOSING TANK

EQUIPMENT

	SCREW PUMP
	FLEXIBLE JOINT

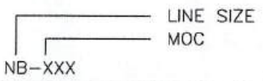
ABBRIVATION

SL	SLUDGE
MV	MOTORIZED VALVE
V	VALVE
G	GATE
T	TANK
SP	SUCTION CLEANING PUMPS

GENERAL

	FLOW SHEETS CONTINUATION
SS 304 MS	PIPING MATERIAL CHANGE

LINE NUMBER SYSTEM



LEGENDS

1) SS – STORE STANDBY
2) S – STANDBY
3) W – WORKING

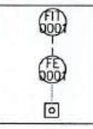
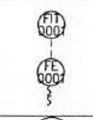
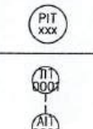
PIPE AND FITTINGS

	NON–RETURN VALVE
	MANUAL BUTTERFLY VALVE
	MOTORIZED BUTTERFLY VALVE
	MANUAL KNIFE GATE VALVE
	MOTORIZED KNIFE GATE VALVE
	BALL VALVE
	PRESSURE RELIEF VALVE
	SOLENOID VALVE
	WALL MOUNTING GATE
	CHANNEL MOUNTED GATE
	CHANNEL MOUNTED MOTORIZED GATE
	CONCENTRIC REDUCER
	MOTORIZED BALL VALVE

LINE LEGEND

	PROCESS FLOW LINE
	SERVICE WATER LINE
	AIR LINE
	CHEMICAL LINE
	SLUDGE LINE
	RCC CHANNEL
	CHLORINE GAS
	CHLORINE SOLUTION
	DRAIN/SECONDARY LINE

ELECTRICAL AND INSTRUMENTATION

	LEVEL SWITCH
	DIFFERENTIAL LEVEL INDICATING TRANSMITTER
	FLOW INDICATING TRANSMITTER THERMAL MASS FLOW TYPE
	FLOW INDICATING TRANSMITTER ULTRASONIC TYPE
	LEVEL INDICATING TRANSMITTER ULTRASONIC TYPE
	PRESSURE GAUGE
	PRESSURE INDICATING TRANSMITTER
	ANALYZER INDICATOR TRANSMITTER
	MOTORIZED ACTUATOR
	DIAPHRAGM SEAL
VFD	VARIABLE FREQUENCY DRIVE
M	MOTOR

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Technocraft Construction Pvt. Ltd.

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	NTS	PROJECTION :	

CLIENT: MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN

CONTRACTOR: M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.

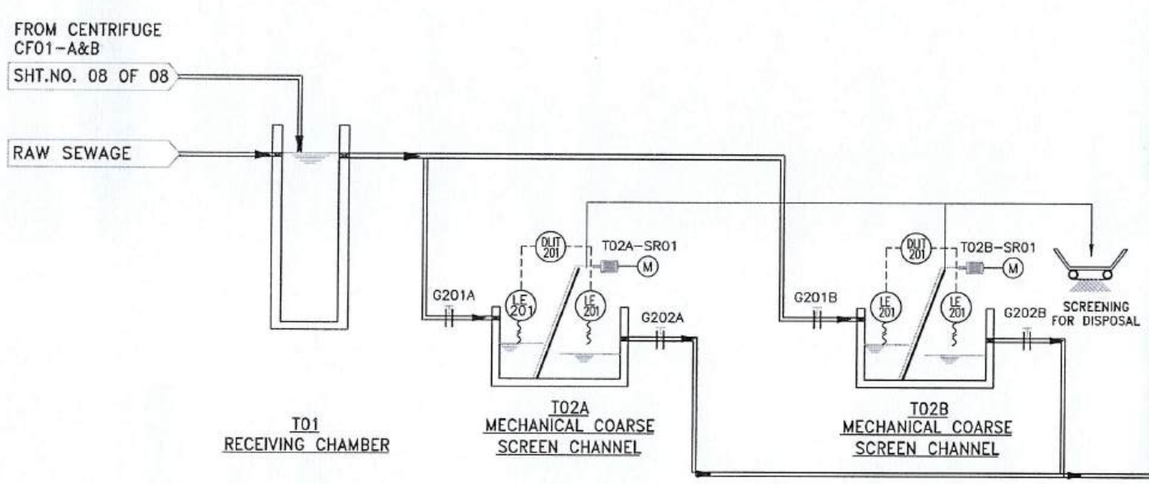
PROJECT: 10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.

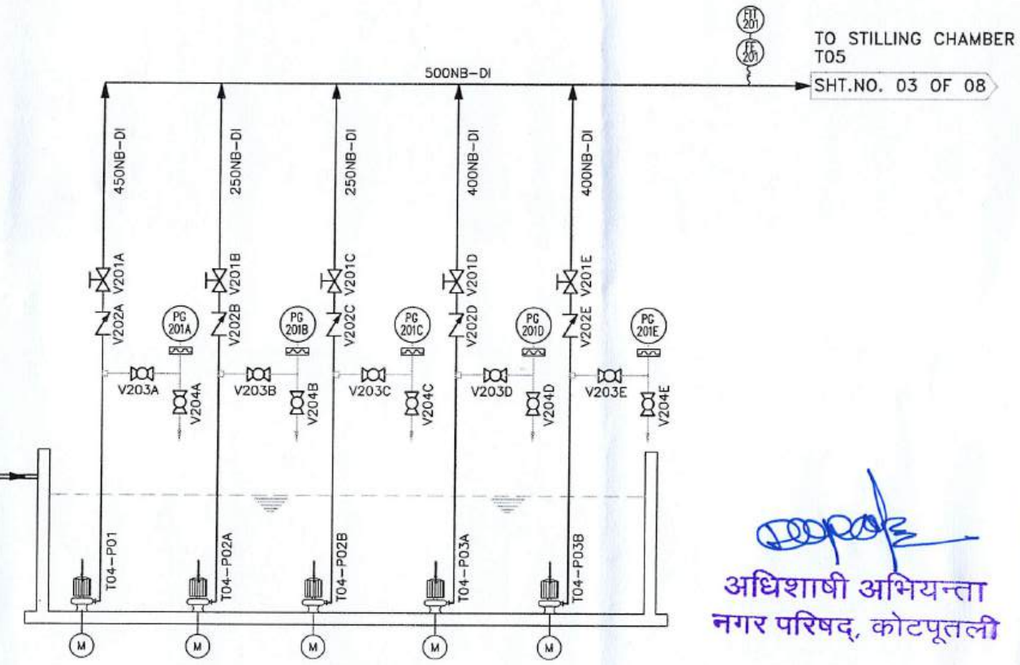
TECHNOLOGY PROVIDER :
SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD
Advanced Technologies for Water . Waste Water . Solid Waste . Energy.
The Ambience Court, Hi-Tech Business Park, 21St Floor
Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705. INDIA.

TITLE: PIPING & INSTRUMENTATION DIAGRAM FOR 10 MLD STP AT KOTPUTLI
(SHEET 01 OF 08)

CONT. CODE	DWG. SIZE	DWG. NO.	REV.
-	A3	TCPL - 10 - PR - 01 - 001	R0

T01	T02	T03	T03-P01	T03-P02A/B	T03-P03A/B
RECEIVING CHAMBER	MECHANICAL COARSE SCREEN CHANNEL	RAW SEWAGE SUMP	RAW SEWAGE TRANSFER PUMPS	RAW SEWAGE TRANSFER PUMPS	RAW SEWAGE TRANSFER PUMPS
QTY. :- 1 NO. (1W.)	QTY. :- 2 NOS.(1W+1SB)	QTY. :- 1 NOS.(1W)	QTY. :- 1 NOS.(1S)	QTY. :- 2 NOS. (1W+1S)	QTY. :- 2 NOS. (2W)
DESIGN FLOW :- 56.63 MLD	DESIGN FLOW :- 56.63 MLD	DESIGN FLOW :- 25.41 MLD	DESIGN FLOW :- 22.910 MLD	DESIGN FLOW :- 22.910 MLD	DESIGN FLOW :- 22.910 MLD
DIMENSION :- 6.5M. LX5.0M. WX 1.3M. SWD	DIMENSION :- 8.0M. LX1.20M. WX0.95M. SWD	DIMENSION :- 13.50 ø x WX2.50M. SWD	DIMENSION :- 955 M3/HR @ 20.0* MWC.	DIMENSION :- 220 M3/HR @ 20.0* MWC.	DIMENSION :- 435 M3/HR @ 20.0* MWC.
MOC :- RCC	MOC :- RCC	MOC :- RCC	MOC :- AS PER TENDER	MOC :- AS PER TENDER	MOC :- AS PER TENDER





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नगर परिषद, कोटपूतली

NOTES :-

1) FOR LEGENDS & SYMBOLS, REFER SHEET NO.- 01 OF 08
2) * HEAD TO BE DECIDED BASED ON FINAL HYDRAULIC & LAYOUT

(V.P. MATHUR)
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Civil Engineering Department
Malaviya National Institute of Technology
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Technocraft Construction Pvt. Ltd.

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	NTS	PROJECTION	

CLIENT: MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN

CONTRACTOR: M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.

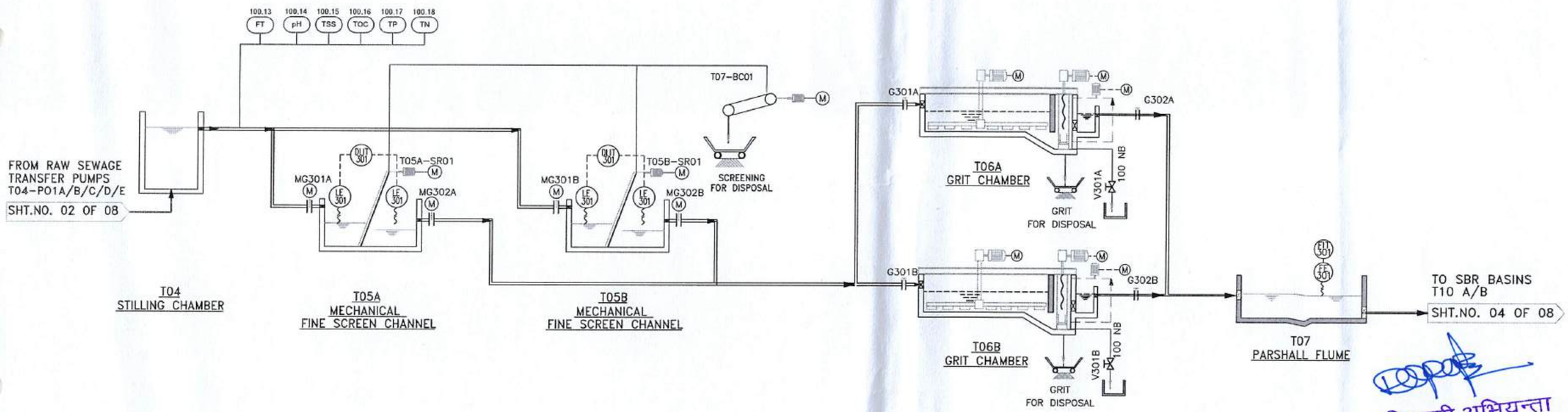
PROJECT: 10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.

TECHNOLOGY PROVIDER :
SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD.
Advanced Technologies for Water , Waste Water , Solid Waste , Energy.
The Ambience Court, Hi-Tech Business Park, 21St Floor
Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705. INDIA.

TITLE: PIPING & INSTRUMENTATION DIAGRAM FOR 10 MLD STP AT KOTPUTLI. (SHEET 02 OF 08)

CONT. CODE	DWG. SIZE	DWG. NO.	REV
-	A3	TCPL - 10 - PR - 01 - 001	R0

T04	T05A/B	T06A/B	T07
STILLING CHAMBER	MECHANICAL FINE SCREEN CHANNEL	MECHANICAL GRIT CHAMBER	PARSHALL FLUME
QTY. :– 1 NO. (1W.)	QTY. :– 2 NOS.(1W+1SB)	QTY. :– 2 NOS. (1W+1S)	QTY. :– 1 NOS.(1W)
DESIGN FLOW :– 22.910 MLD	DESIGN FLOW :– 22.910 MLD	DESIGN FLOW :– 22.910 MLD	DESIGN FLOW :– 22.910 MLD
DIMENSION :– 2.10M. LX2.00M. WX2.00M. SWD	DIMENSION :– 8.0M. LX0.85M. WX0.65M. SWD	DIMENSION :– 5.0M.L X 5.0M.W X 0.9M.SWD	DIMENSION :– SUITABLE
MOC :– RCC	MOC :– RCC	MOC :– RCC	MOC :– RCC



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नगर परिषद, कोटपूतली

NOTES :–

1) FOR LEGENDS & SYMBOLS, REFER SHEET NO.– 01 OF 08

CLIENT:	MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN
CONTRACTOR:	M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.
PROJECT:	10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.
TECHNOLOGY PROVIDER :	SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD. Advanced Technologies for Water . Waste Water . Solid Waste . Energy. The Ambience Court, Hi-Tech Business Park, 21St Floor Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705, INDIA.
TITLE:	PIPING & INSTRUMENTATION DIAGRAM FOR 10 MLD STP AT KOTPUTLI (SHEET 03 OF 08)

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	NTS	PROJECTION :	

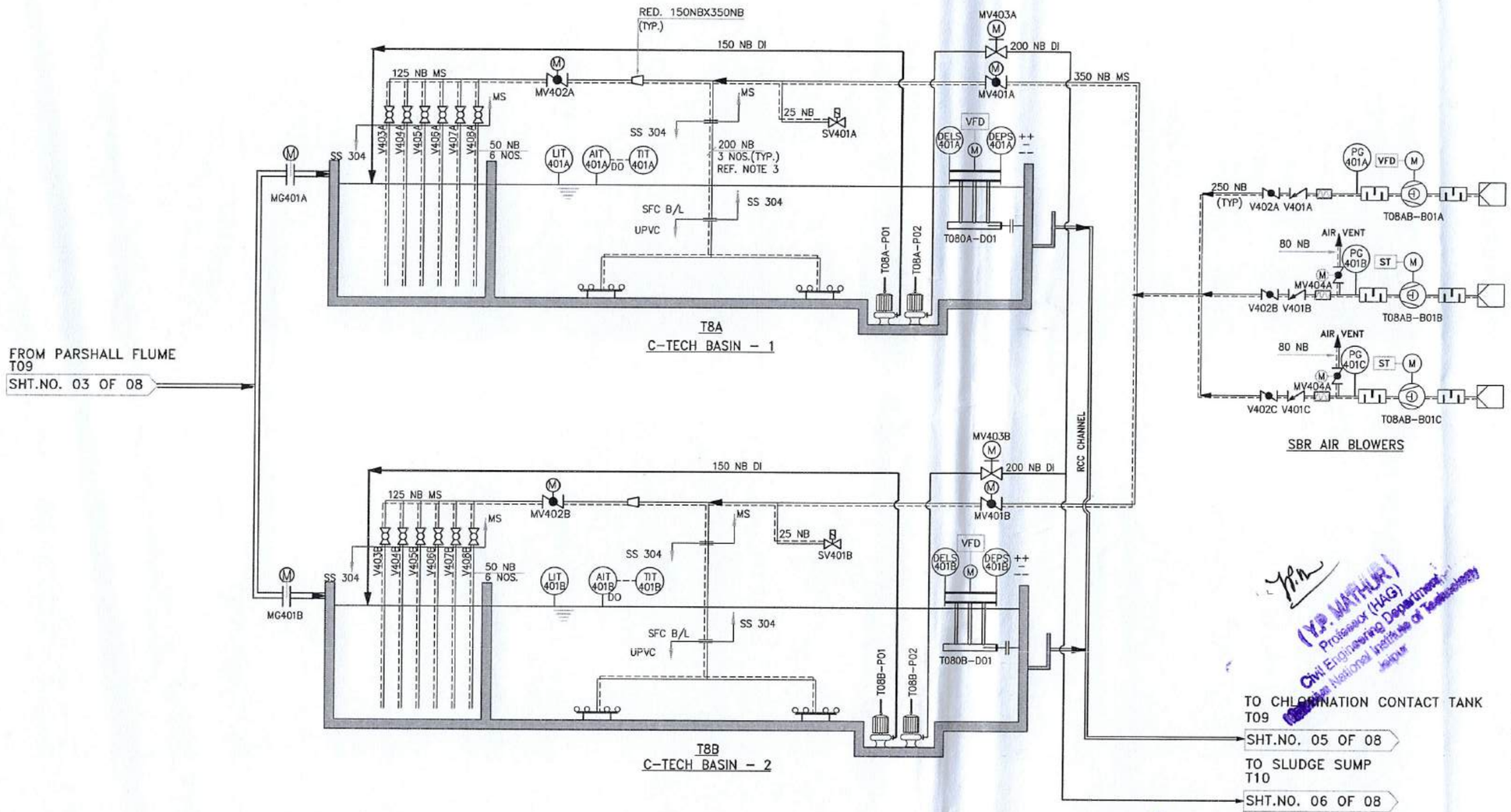
CONT. CODE	DWG. SIZE	DWG. NO.	REV.
-	A3	TCPL - 10 - PR - 01 - 001	R0

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

(Y.P. MATHUR)
Professor (HAG)
Civil Engineering Department
Malaviya National Institute of Technology
Jaipur

Technocraft Construction Pvt. Ltd.

T08A/B	T08A/B-P01	T08A/B-P02	T08A/B-B01ABC
SBR BASINS	RAS PUMPS	SAS PUMPS	SBR AIR BLOWERS
QTY. :- 1 NOS.	QTY. :- 3 NOS. (2W+1SS)	QTY. :- 3 NOS. (2W-1SS)	QTY. :- 3 NOS.(2W+1SB)
DESIGN FLOW :- 22.910 MLD	RATED CAPACITY :- 110 M3/HR.	RATED CAPACITY :- 160 M3/HR.	RATED CAPACITY :- 2500 NM3/HR
DIMENSION :- 43.30M. ø WX6.00M. SWD	HEAD :- MAX. 5.0 MWC*	HEAD :- 10.0 MWC*	RATED DIFF. HEAD :- 0.70 KG/CM2
MOC :- RCC	MOC :- AS PER TENDER	MOC :- AS PER TENDER	



FROM PARSHALL FLUME T09
SHT.NO. 03 OF 08

TO CHLORINATION CONTACT TANK T09
SHT.NO. 05 OF 08

TO SLUDGE SUMP T10
SHT.NO. 06 OF 08

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Jaipur

अधिशाषी अभियन्ता
नगर परिषद्, कोटपूतली

Technocraft Construction Pvt. Ltd.

NOTES :-
1) FOR LEGENDS & SYMBOLS, REFER SHEET NO.- 01 OF 08
2) DIFFUSERS LAYOUT & LATERAL PIPES GRID SHALL BE AS PER SFC DIFFUSERS GENERAL ARRANGEMENT DRAWING ONLY.
3) NUMBER & SIZE OF DOWNCOMER IS SUBJECTED TO CHANGE AS PER SFC C-TECH DIFFUSERS LAYOUT.
4) * HEAD TO BE DECIDED BASED ON FINAL HYDRAULIC & LAYOUT

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	NTS	PROJECTION :	

CLIENT: MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN

CONTRACTOR: M/s TECHNOCRAFT CONSTRUCTION PVT LTD

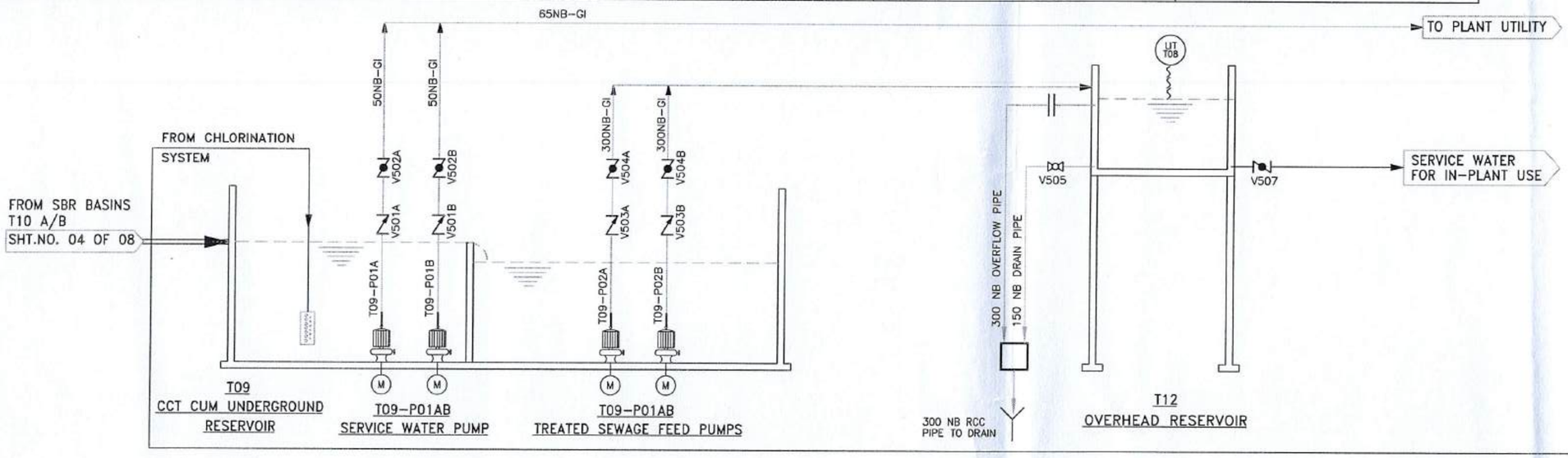
PROJECT: 10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN

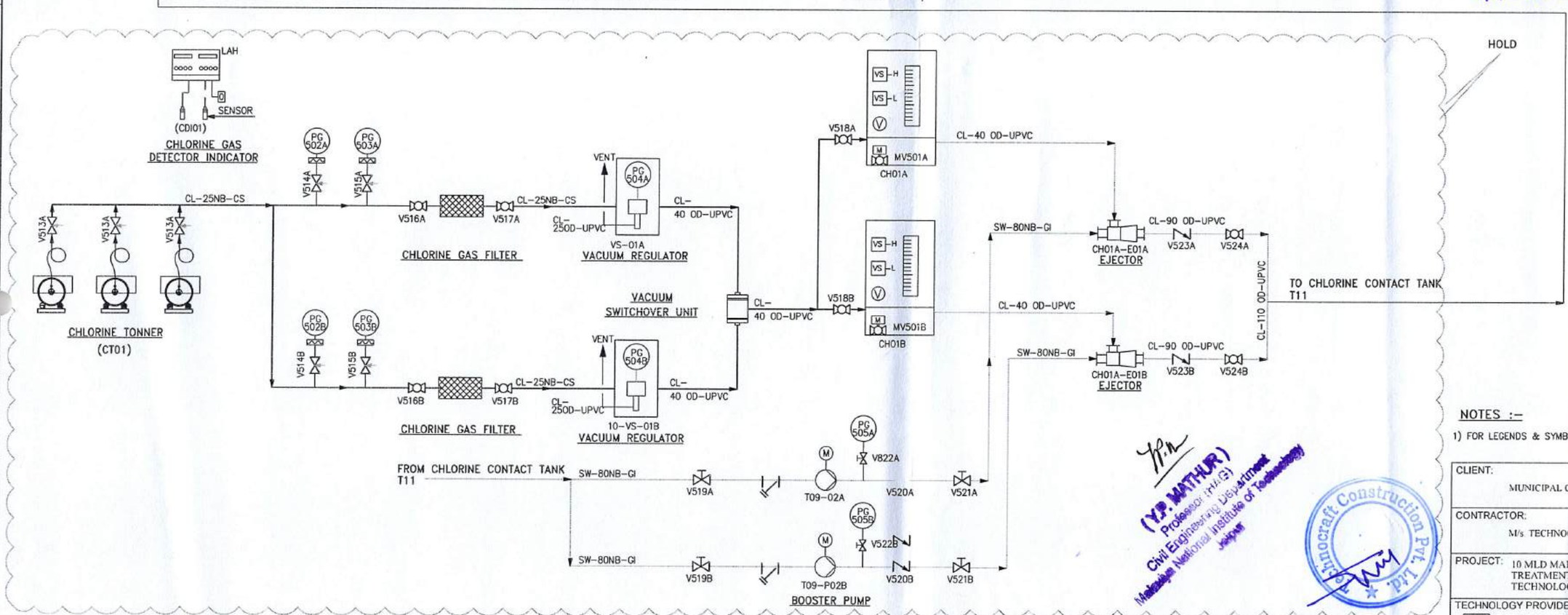
TECHNOLOGY PROVIDER :
SFC ENVIRONMENTAL TECHNOLOGIES PVT LTD
Advanced Technologies for Water , Waste Water , Solid Waste , Energy.
The Ambience Court, Hi-Tech Business Park, 21st Floor
Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705. INDIA.

TITLE: PIPING & INSTRUMENTATION DIAGRAM FOR 10 MLD STP AT KOTPUTLI (SHEET 04 OF 08)

CONT. CODE	DWG. SIZE	DWG. NO.	REV.
-	A3	TCPL - 10 - PR - 01 - 001	R0

CH01AB	T09	T09-P01A/B	T09-P02A/B	T12
CHLORINATOR	CCT CUM UNDERGROUND RESERVOIR	SERVICE WATER PUMP	TREATED SEWAGE FEED PUMPS	OVERHEAD RESERVOIR
QTY. :- 2 NOS.	QTY. :- 1 NO.	QTY. :- 2 NOS. (1W+1S)	QTY. :- 2 NOS. (1W+1S)	QTY. :- 1 NO.
RATED CAPACITY :- 4 KG/HR.	CAPACITY :- 1500 KL	RATED CAPACITY :- 10 M3/HR.	RATED CAPACITY :- 420 M3/HR.	CAPACITY :- 500 M3.
	DIMENSION :- -	RATED DIFF. HEAD :- 30 KG/CM2	RATED DIFF. HEAD :- 30 KG/CM2	DIMENSION :- 14.60 ø X 3.50 SWD
	MOC :- RCC	MOC CASING :- AS PER TENDER	MOC CASING :- AS PER TENDER	MOC :- RCC





NOTES :-

1) FOR LEGENDS & SYMBOLS, REFER SHEET NO.- 01 OF 08

अधिशाषी अभियन्ता
नगर परिषद, कोटपूतली

(Y.P. MATHUR)
Professor (HAG)
Civil Engineering Department
Malaviya National Institute of Technology
Jaipur

Technocraft Construction Pvt. Ltd.

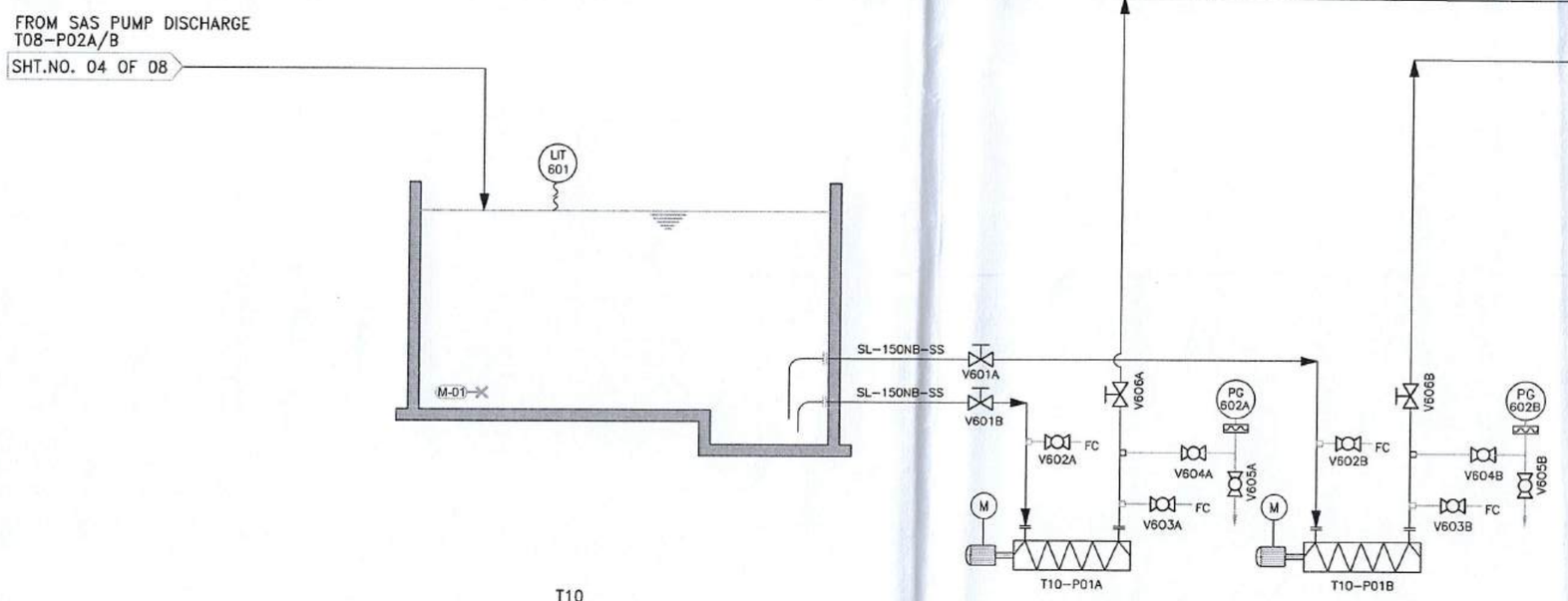
CLIENT:	MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN
CONTRACTOR:	M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.
PROJECT:	10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN
TECHNOLOGY PROVIDER :	SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD. Advanced Technologies for Water , Waste Water , Solid Waste , Energy. The Ambience Court, Hi-Tech Business Park, 215I Floor, Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705. INDIA.
TITLE:	PIPING & INSTRUMENTATION DIAGRAM FOR 10 MLD STP AT KOTPUTLI (SHEET 05 OF 08)

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	NTS	PROJECTION :	

CONT. CODE	DWG. SIZE	DWG. NO.	REV.
-	A3	TCPL - 10 - PR - 01 - 001	R0

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

T10	M-01	T10-P01A/B
SLUDGE SUMP	SLUDGE SUMP MIXER	CENTRIFUGE FEED PUMPS
QTY. :- 1 NOS.	QTY. :- 1 NO.	QTY. :- 2 NOS. (1W+1SB)
DIMENSION :- 7.00 L X 6.00 W X 2.60 SWD	RATED CAPACITY :- 3 KW	RATED CAPACITY :- 24 m3/hr.
MOC :- RCC	HEAD :- -	RATED DIFF. HEAD :- 25 MWC
	MOC :- AS PER TENDER	MOC :- AS PER TENDER



T10
SBR SLUDGE SUMP

CENTRIFUGE FEED PUMPS

अधिशाषी अभियन्ता
नगर परिषद, कोटपूतली

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Jaipur

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NOTES :-

1) FOR LEGENDS & SYMBOLS, REFER SHEET NO.- 01 OF 08

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	NTS	PROJECTION	

CLIENT: MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN

CONTRACTOR: M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.

PROJECT: 10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.

TECHNOLOGY PROVIDER :
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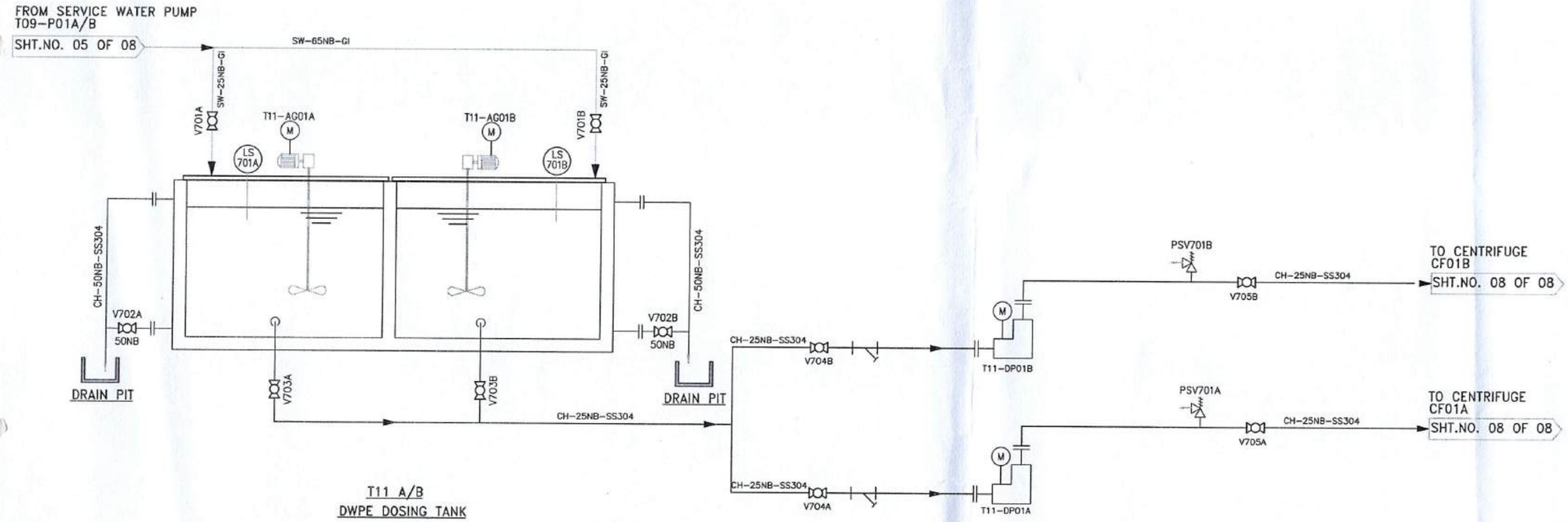
Advanced Technologies for Water , Waste Water , Solid Waste , Energy.
The Ambience Court, Hi-Tech Business Park, 21St Floor
Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705, INDIA.

TITLE: PIPING & INSTRUMENTATION DIAGRAM FOR 10 MLD STP AT KOTPUTLI (SHEET 06 OF 08)

CONT. CODE	DWG. SIZE	DWG. NO.	REV.
-	A3	TCPL - 10 - PR - 01 - 001	R0

T11A/B	T11-AG01A/B	T09
DWPE DOSING TANK	AGITATOR FOR DOSING TANK	DWPE DOSING PUMPS
QTY. :- 2 NOS.	QTY. :- 2 NOS. (2W)	QTY. :- 2 NO. (1W+1S)
DIMENSION :- 2.00 L X 2.00 W X 1.20 SWD	RATED CAPACITY :- 0.55 KW.	RATED CAPACITY :- 1350 LPH.
MOC :- RCC	RPM :- 100	HEAD :- 1.5 KG/CM2
	MOC :- AS PER TENDER	MOC :- RCC



T11 A/B
DWPE DOSING TANK

अधिशाषी अभियन्ता
नगर परिषद, कोटपूत

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Malaviya National Institute of Technology
Jaipur

Technocraft Construction Pvt. Ltd.

NOTES :-

1) FOR LEGENDS & SYMBOLS, REFER SHEET NO.- 01 OF 08

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

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DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	NTS	PROJECTION	

CLIENT: MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN

CONTRACTOR: M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.

PROJECT: 10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.

TECHNOLOGY PROVIDER :
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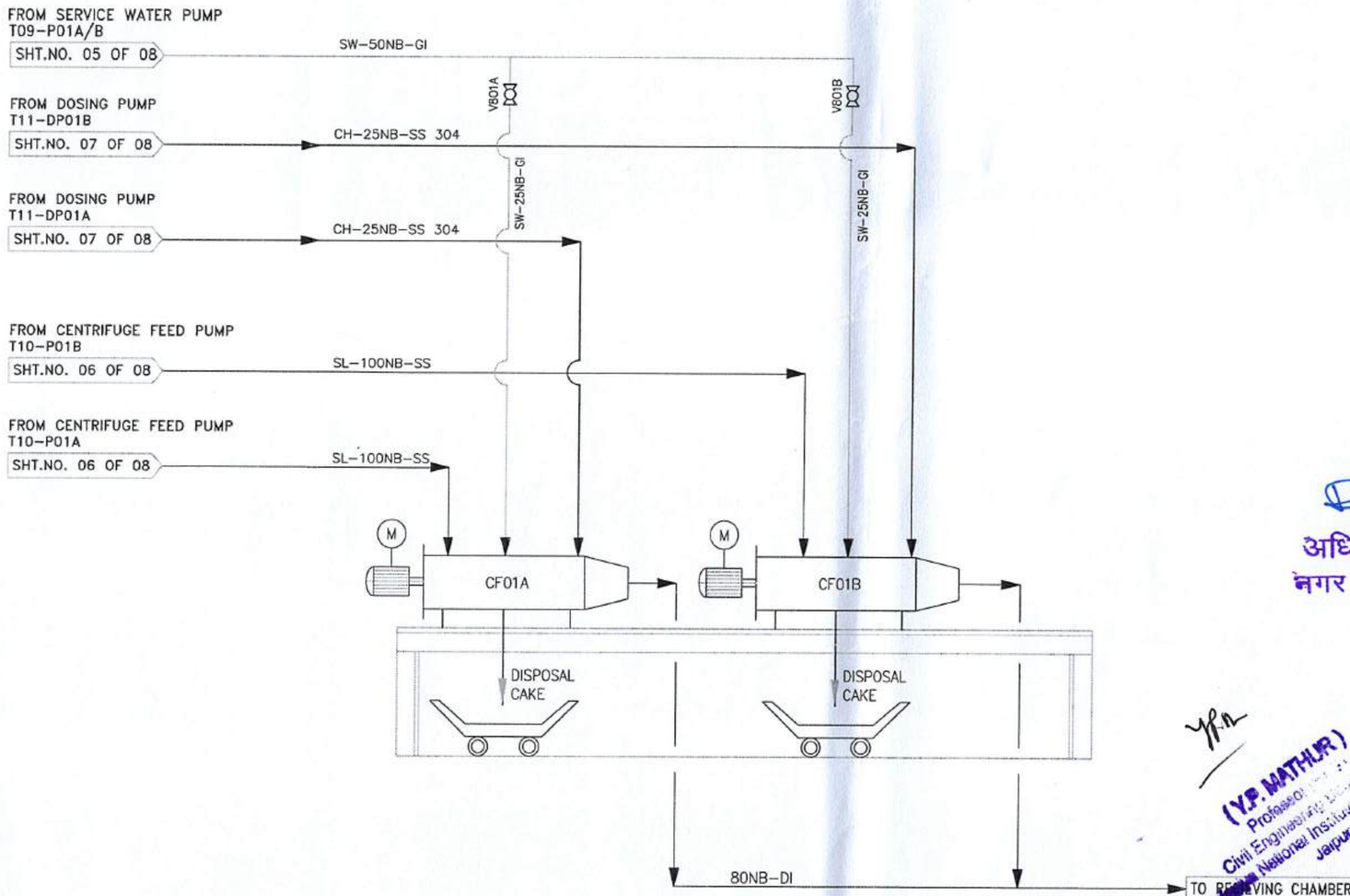
Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705. INDIA.

TITLE: PIPING & INSTRUMENTATION DIAGRAM FOR 10 MLD STP AT KOTPUTLI (SHEET 07 OF 08)

CONT. CODE	DWG. SIZE	DWG. NO.	REV
-	A3	TCPL - 10 - PR - 01 - 001	R0

CF01A/B	
DEWATERING MACHINE	
QTY.	:– 1 NO.
DIMENSION	:– 24.00 M3/HR.
MOC	:– SS 304



अधिशाषी अभियन्ता
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Jaipur

Technocraft Construction Pvt. Ltd.

NOTES :–

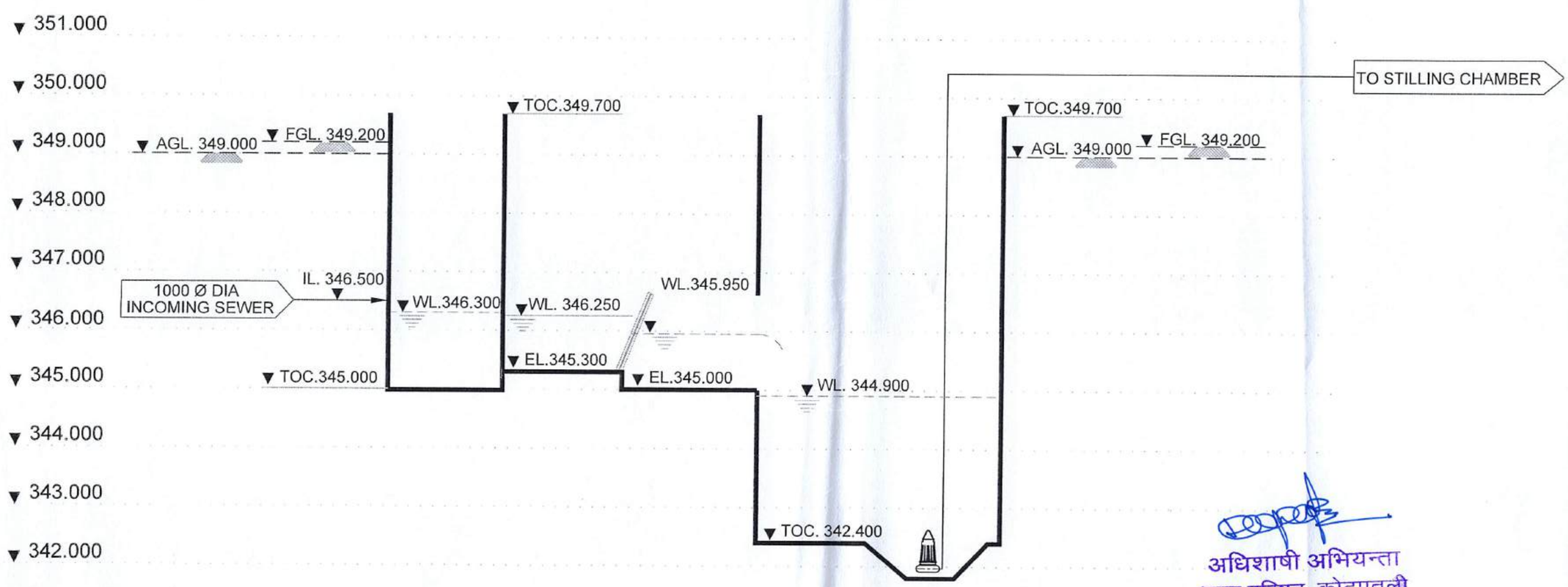
1) FOR LEGENDS & SYMBOLS, REFER SHEET NO.– 01 OF 08

CLIENT:	MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN
CONTRACTOR:	M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.
PROJECT:	10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.
TECHNOLOGY PROVIDER :	SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD. Advanced Technologies for Water , Waste Water , Solid Waste , Energy. The Ambience Court, Hi-Tech Business Park, 21St Floor Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705. INDIA.
TITLE:	PIPING & INSTRUMENTATION DIAGRAM FOR 10 MLD STP AT KOTPUTLI (SHEET 08 OF 08)

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	NTS	PROJECTION :	

CONT. CODE	DWG. SIZE	DWG. NO.	REV
-	A3	TCPL - 10 - PR - 01 - 001	R0



अधिशाषी अभियन्ता
नगर परिषद, कोटपूतली

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National Institute of Technology
JAIPUR

NOTE :-

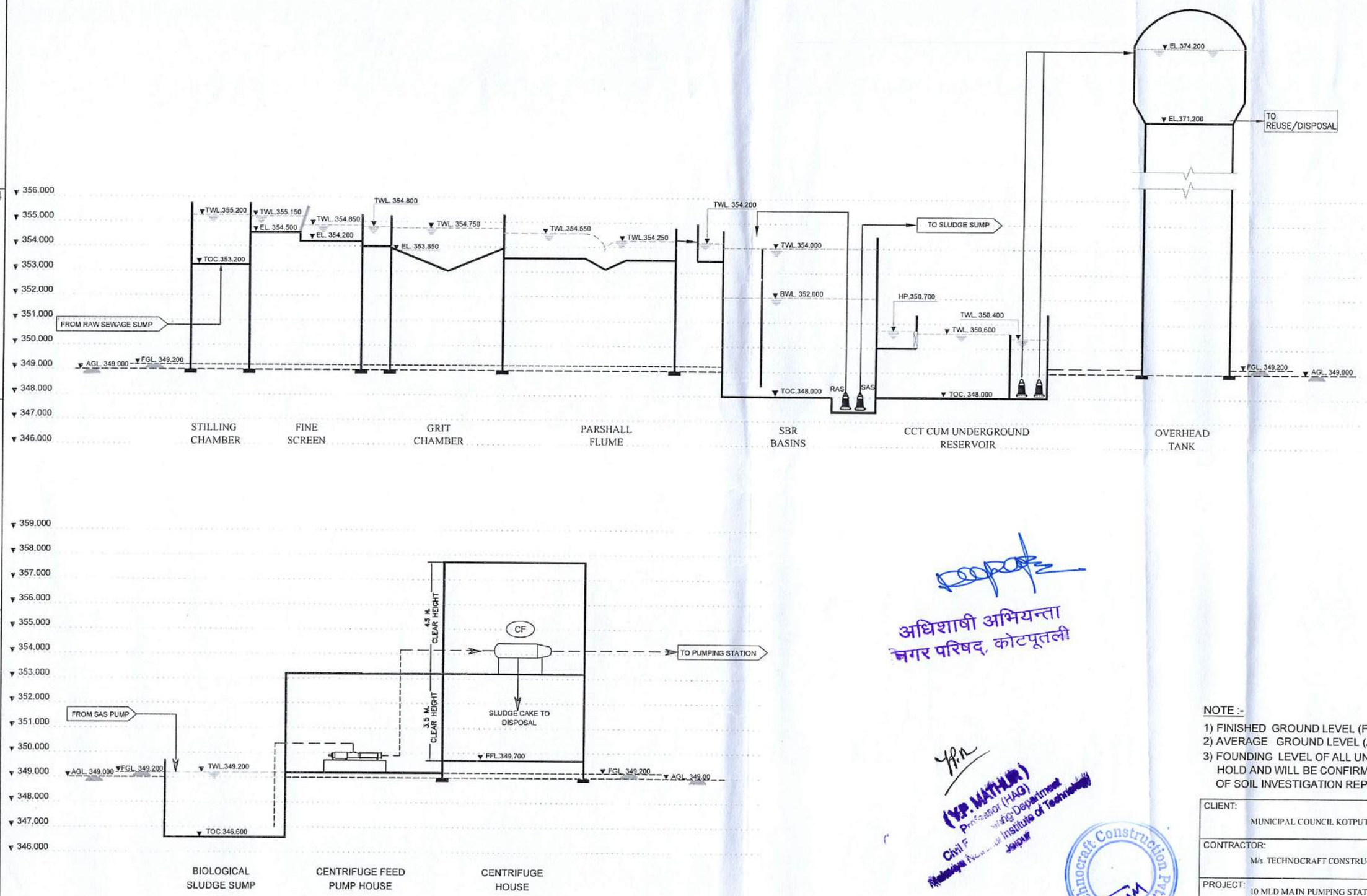
1) FINISHED GROUND LEVEL (FGL.) = 349.200
2) AVERAGE GROUND LEVEL (AGL.) = 349.000
3) FOUNDING LEVEL OF ALL UNITES ARE ON HOLD AND WILL BE CONFIRMED ON RECEIVAL OF SOIL INVESTIGATION REPORT.

CLIENT:	MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN
CONTRACTOR:	M/s TECHNOCRAFT CONSTRUCTION PVT LTD
PROJECT:	10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.
TECHNOLOGY PROVIDER :	SFC ENVIRONMENTAL TECHNOLOGIES PVT LTD Advanced Technologies for Water , Waste Water , Solid Waste , Energy. The Ambience Court, Hi-Tech Business Park, 21St Floor Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705. INDIA.
TITLE:	HYDRAULIC FLOW DIAGRAM FOR SHEET NO. 01 OF 02

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	1:150	PROJECTION :	

CONT. CODE	DWG. SIZE	DWG. NO.	REV.
-	A3	TCPL - 10 - PR - 03 - 001	R0



अधिशाषी अभियन्ता
नगर परिषद, कोटपूतली

(Y.P. MATHUR)
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Civil Engineering Department
Maharaja Agrasen Institute of Technology
Delhi

Technocraft Construction Pvt. Ltd.

NOTE :-

1) FINISHED GROUND LEVEL (FGL.) = 349.200
2) AVERAGE GROUND LEVEL (AGL.) = 349.000
3) FOUNDING LEVEL OF ALL UNITES ARE ON HOLD AND WILL BE CONFIRMED ON RECEIVAL OF SOIL INVESTIGATION REPORT.

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

	DATE	BY	SIGN
DRAWN	29-05-2024		
DESIGNED	29-05-2024		
CHECKED	29-05-2024		
APPROVED	29-05-2024		
SCALE	1:150	PROJECTION	

CLIENT: MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN

CONTRACTOR: M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.

PROJECT: 10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.

TECHNOLOGY PROVIDER :
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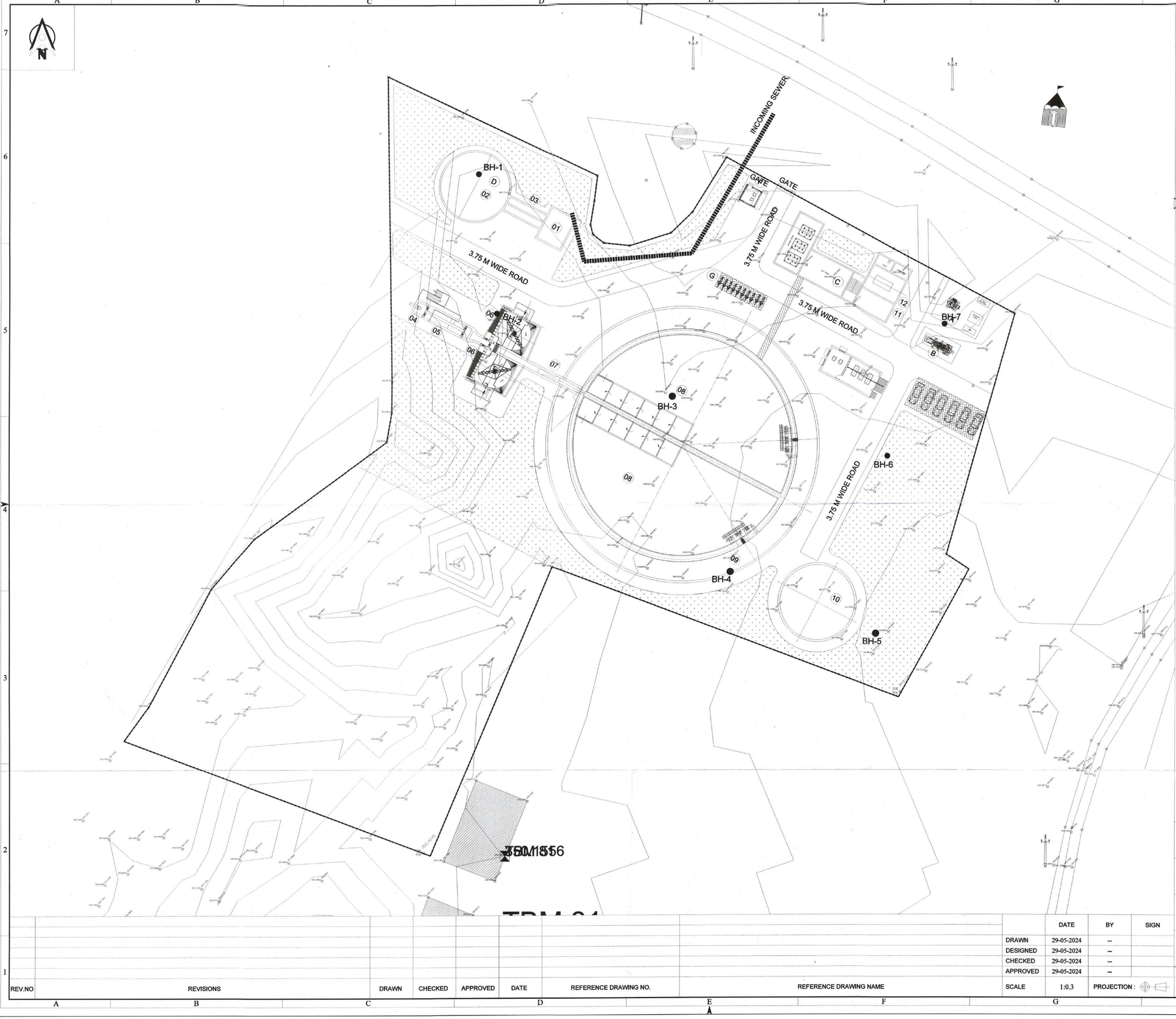
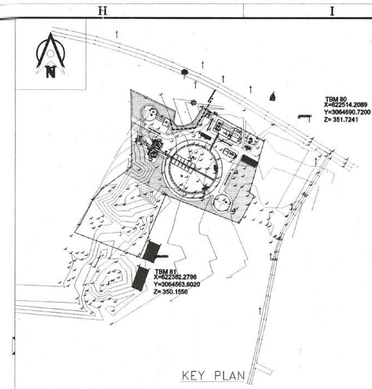
Advanced Technologies for Water , Waste Water , Solid Waste , Energy.
The Ambience Court, Hi-Tech Business Park, 21St Floor
Sector 19-D, Plot No.2, Vashi, Navi Mumbai-400 705. INDIA.

TITLE: HYDRAULIC FLOW DIAGRAM FOR
SHEET NO. 02 OF 02

CONT. CODE	DWG. SIZE	DWG. NO.	REV.
-	A3	TCPL - 10 - PR - 03 - 001	R0

THIS DRAWING AND ALL INFORMATION CONTAINED WITHIN IS THE PROPERTY OF M/S SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD. THIS DRAWING IS SUBMITTED UNDER A CONFIDENTIAL RELATIONSHIP SPECIFICALLY FOR THE RECIPIENT'S USE ON A DESIGNATED PROJECT. REPRODUCTION OF THIS DRAWING OR USE OF ITS CONTENTS IN WHOLE OR IN PART WITHOUT THE WRITTEN PERMISSION OF M/S SFC ENVIRONMENTAL TECHNOLOGIES PVT. LTD. IS STRICTLY PROHIBITED.





KEY PLAN

PROCESS UNITS

SL.NO.	PROCESS UNITS	SIZE/CAPACITY	QTY	REMARK
01	RECEIVING CHAMBER	6500 x 5000 x 1500 SWD	01	RCC
02	COARSE SCREEN CHANNEL-MECHANICAL	8000 x 1200 x 950 SWD	02	RCC
03	RAW SEWAGE SUMP	13500 DIA x 2500 SWD	01	RCC
04	INLET CHAMBER	2100 x 2000 x 2000 SWD	01	RCC
05	FINE SCREEN CHANNEL-MANUAL	8500 x 850 x 650 SWD	02	RCC
06	GRIT CHAMBER - MECHANICAL	5000 x 5000 x 900 SWD	02	RCC
07	PARSHALL FLUME	AS PER SITE	01	RCC
08	SBR BASINS	43300 ø x 6000 SWD	02	RCC
09	CCT-CUM GROUND SERVICE RESERVOIR	1500 m3	01	RCC
10	OVERHEAD SERVICE RESERVOIR	14000 ø x 3000 SWD	01	RCC
11	DWPE DOSING TANK (ABOVE ADMIN)	2000 DIA x 1500 SWD	02	RCC
12	SLUDGE SUMP	7000 x 6000 x 2600 SWD	01	RCC

BUILDING LIST

A	HT SUBSTATION/TRANSFORMER YARD	10000 x 8000	01	
B	DG PLATFORM	8000 x 4000	01	
C	ADMIN/AIR BLOWER ROOM/MCC ROOM	115 SQM x SUITABLE HT	01	G+1
	CENTRIFUGE HOUSE	33 SQM x SUITABLE HT	01	
D	MPS PANEL ROOM	13500 ø x 4500 HT	01	
E	CHLORINATION & CHLORINE TONNER ROOM	10500 x 5000 x SUITABLE HT	01	
F	SECURITY CABIN	3000 x 3000 x 3000 HT	01	
G	PARKING SHED	AS SHOWN	01	

TOTAL PLOT AREA = 12942 Sq.M

NOTES :-

1) ALL DIMENSIONS ARE IN MM AND ALL LEVELS ARE IN METERS UNLESS OTHERWISE NOTED.
2) BUILDING SIZES MENTIONED ARE INDICATIVE & MAY INCREASE OR DECREASE AS PER ACTUAL EQUIPMENT SIZE.

Technocraft Construction Pvt. Ltd.

CLIENT:
MUNICIPAL COUNCIL KOTPUTLI, RAJASTHAN

CONTRACTOR:
M/s. TECHNOCRAFT CONSTRUCTION PVT. LTD.

V.P. MATHUR
Technical (HAG)
Civil Engineering Department
Malaviya National Institute of Technology
Jaipur

PROJECT:
10 MLD MAIN PUMPING STATION AND SEWAGE TREATMENT PLANT BASED ON C-TECH TECHNOLOGY AT KOTPUTLI, RAJASTHAN.

अधिशाषी अभियन्ता
नगर परिषद, कोटपूतली

TITLE:
PLANT LAYOUT

	DATE	BY	SIGN
DRAWN	29-05-2024	--	
DESIGNED	29-05-2024	--	
CHECKED	29-05-2024	--	
APPROVED	29-05-2024	--	
SCALE	1:0.3	PROJECTION :	

REV.NO	REVISIONS	DRAWN	CHECKED	APPROVED	DATE	REFERENCE DRAWING NO.	REFERENCE DRAWING NAME

CONT. CODE	DWG. SIZE	DWG. NO.	REV.
-	A1	TCPL/MCK/KPL/10 MLD/LAY/01 01/01	R0

संलग्न-द
Annexure D

गावो विश्वस्य मातरम्।।

।।गोपाल जय गौ माता।।

रजि.क्रमांक 775 जयपुर -2009-10

श्री ध्यान जी गौ सेवा समिति

चतुर्भुज ,कोटपूतली (जयपुर) राज.

क्रमांक

दिनांक 17/05/24

सेवामें,

श्रीमान् कमिशनर महोदय,
नगरपरिषद कोटपूतली

विषय :– जन कल्याण कार्य हेतु चतुर्भुज

महोदय,

समस्त ग्राम जनता व महाराज जी गौशाला संचालक श्री रतन दास जी महाराज चतुर्भुज एवं समस्त ग्रामवासी की सर्व सहमति से निर्णय लिया गया है कि आप S.T.P. प्लान्ट अपनी पूर्व में निर्धारित जगह पर कार्य सुचारू रूप से कर सकते हैं इसमें ग्रामवासियों को किसी भी प्रकार की आपति नहीं है।

अतः आप कार्य शुरू करने से पहले समस्त ग्रामवासियों की मांग सरकारी स्कूल की चारदीवारी व श्री ध्यानजी गौशाला में गायों के लिए 120X40 फुट की टीन शैड मकान बनाने का श्रम करें।

प्रार्थी

समस्त ग्रामवासी
चतुर्भुज, कोटपूतली

प्रतिलिपि –
1.श्रीमान् विधायक महोदय, कोटपूतली
2. टैक्नोक्राफ्ट कन्स्ट्रक्शन प्रा0लि0 कोटपूतली

संलग्न-य
Annexure-E

सेवा में,

श्रीमान तहसीलदार महोदय
कोटपूतली

विषय:- STP के नये प्रस्ताव के लिये।

महोदय

उपरोक्त विषयान्तर्गत निवेदन है कि ग्राम-अनुकूल में ब.न. 714/660 किस्म-बंजड़ में STP के नये प्रस्ताव के लिये आवेदन प्राप्त हुआ है। परन्तु श्रीमानजी उक्त ब.न. नदी के मुख्य बहाव क्षेत्र का है। जिसमें राजस्थान प्रदूषण केन्द्र विभाग से निर्माण की एवम् चलाने की स्वीकृति नहीं की जावेगी। रिपोर्ट श्रीमानजी की सेवा में सादर पेश है।

16-01-24

पटवारी
पटवार मण्डल...अनुकूल
तहसील कोटपूतली
जिला-कोटपूतली-बहरोड़ (राज०)

प्रतिलिपि:-
1. नगरपरिषद आयुक्त महोदय कोटपूतली
2. XEN नगरपरिषद कोटपूतली