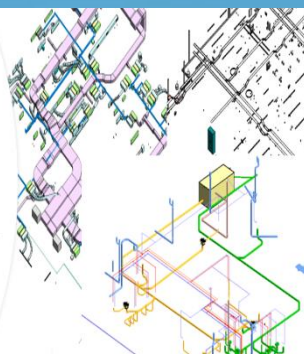


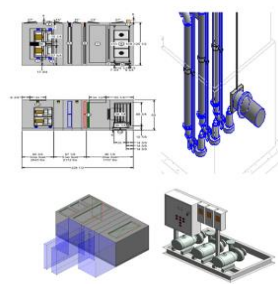
Pre – Construction Services For MEP SYSTEMS (MECHANICAL, PLUMBING & ELECTRICAL)

MEP
Engineering
calculation

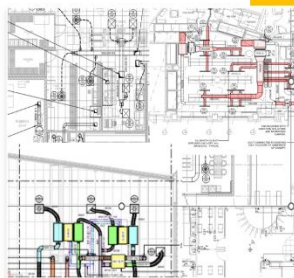
Design 3D
Model-LOD 300



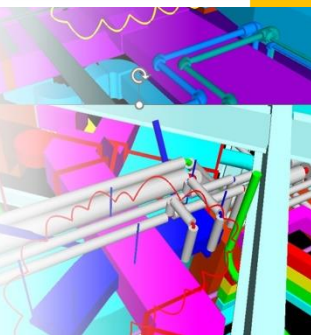
Equipment
Modeling



Design
Drawing



BIM
Co- ordination



Bill of Material
(Quantity Take off)

QUANTITY TAKE OFF - BIM									
CATEGORY	MATERIAL	SYSTEM	GAUGE	SIZE	JOINT1	JOINT2	LENGTH	QTY	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	60X70	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	70X70	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	70X40	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	60X40	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	70X50	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	80X50	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	80X60	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	80X70	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	80X80	P.T.2	P.T.2	4000	1	
Rectangular Ductwork	GALVANIZED	CAL.M.P.AIR	28	80X100	P.T.2	P.T.2	4000	1	

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- Execution Process
- D & D Core Team
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About us

DESIGN AND DRAWING SOLUTION offers Pre - construction documents for MEP systems. Our MEP team is having good knowledge of Australia & New Zealand MEP engineering designs & Pre construction document process & codes and guidelines.

Mechanical – AS1668.2 – 2012, AS 4254.2-2012, ASHRAE, SMACNA

| Plumbing – AS3500, IPC

| Electrical – NFPA, NEC

We are familiar with Australia & New Zealand standard practice and requirement of MEP design for all type of buildings, Industrial warehouses & Infrastructure construction i, e. from Interior Fit outs, single family apartment, high rise apartment, commercial office buildings, hotels, restaurant, hospitals, School, College including infrastructure construction like Airport, metro stations etc.

Using our BIM and 2D CAD outsourcing services, our clients have numerous advantages i.e. including time and cost savings which are realized during the design phase and more importantly, during the installation and build stages of construction projects. We are certified Autodesk users and started in Mumbai, India from early 2018 and having our representative in US as well as channel Partner.



6+
Years' Experience

300+
Completed Projects

150+
Customer world wide

Building Types includes

- Interior Fit out for Commercial / Residential
- Bungalows /Residential Apartments
- High Rise Residential building
- Commercial IT / Banks
- Hotels
- Institutional Buildings like school, Libraries, Auditoriums
- Hospital
- Entertainment Zones, Malls and Multiplexe
- Data Centre
- Industrial ware house

MEP Engineering Calculation

- Thermal Load Calculation
- Duct Pipe Sizing
- Ventilation Calculation
- Hydraulic Drainage & Water
- Pump Head Calculation
- Electrical Detail Engineering

Pre – Construction BIM Services

- Design 3D model (LOD -300)
- Design drawing
- BIM Co-ordination
- Qty Take off

CAD Services

- CAD Design Drawing
- Quantity Take Off

MEP Engineering calculation

Thermal Load calculation

As per the international standard like ASHRAE guidelines, we do thermal load calculation through HAP which we use to provide for our existing client for the mechanical system design assistance.

Basic Consideration or important factors are as follows.

1. Building North & Location for Outdoor design
2. Indoor Design Condition
3. U values for building envelope
4. Ventilation requirement and light

Duct Sizing & Flow measurement

As per the ASHRAE Standards, our engineering team use to calculate the duct size a per constant velocity method. Standard Recommendation are as follows
Recommended Velocity

Supply Duct & Return Duct:

500 – 750 FPM

Exhaust Duct:

Shall be greater 500FPM

Upto 1500 fmp

R/N	Area name	Area(SFT)	Height (M)	CFM	No Of Diffuser	CFM/Diff user	Design Velocity (FPM)	Area (SFT)	Area (SQMT)	Calculate d Duct Size (mm)	Proposed Design Duct Size
2	KITCHEN / PTY	303	2.7	536	3	179	600	0.297778	0.027675	187.76	200.00
3	ENTRY	324	2.7	606	3	202	600	0.336667	0.031289	199.65	200.00
4	FAMILY	413	2.7	732	4	183	600	0.305	0.028346	190.02	200.00
A2	Zone 2	149	2.7	263	1	263	600	0.438333	0.040737	227.80	250.00
A3	Zone 3	285	2.7	504	1	504	600	0.84	0.078067	315.35	350.00
B	Level - 2										
B1	Zone 4	383	2.7	679	3	226	600	0.377222	0.035058	211.33	250
1	MASTER	390	2.7	692	3	231	600	0.384444	0.035729	213.34	250
2	BED 1	136	2.7	242	2	121	600	0.201667	0.018742	154.52	200
B2	Zone 5										
1	RUMPU 2	207	2.7	367	2	184	600	0.305833	0.028423	190.28	200
2	BED 2	164	2.7	290	2	145	601	0.241265	0.022422	169.01	200
3	BED 3	162	2.7	287	2	144	602	0.238372	0.022154	167.99	200

Pipe Sizing

As per ASHRAE standard, we use to calculate pipe size based on the constant velocity standard.

Recommended Velocity for Piping

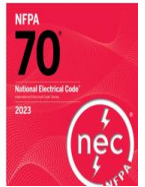
Branch Pip 0.5 m/se

Branch Header 0.7

-1 m/sec

Main Header 1- 2 m/sec

Based on the flow and standard recommended velocity, we use to calculate pipe size.



Ventilation Calculation

To calculate ventilation airflow, we use to follow recommended air changes per hour as per ASHRAE guidelines and based on the air changes, we calculate the ventilation airflow for proposed Zone.

Sr. No.	ROOM NAME	ROOM AREA (SQM)	HEIGHT (M)	L/s (@5 ACH)	Remarks
MAU 2					
1	BODY SHOP	41.02	6.8	387	
2	LUBE ROOM	23.32	6.8	220	
3	REPAIR GARAGE	1699.5	6.8	16051	
4	SMALL EQUIP. REPAIR	395.7	6.8	3737	
5	TIRE REPAIR	141.04	6.8	1332	
6	CORR 1	43.2	6.8	408	
7	CORR 2	5.65	6.8	53	
8	TOOL LOCKUP & CONSUMMABLES	19.64	6.8	185	

Hydraulic Engineering -Drainage, Water & Vent

We use to do Plumbing hydraulic calculation based on the hydraulic fixture values as per code and equivalent water flow based on the hydraulic codes like ASPE and IPC.

Drainage Pipe Sizing

Individual fixtures connections are available based on the type of fixture and list as follows.

And maximum no of fixture to be connected as per the standards.

In standard practice we use 2, 3 & 4 inch of pipe sizes to cover the sewer drainage systems in small buildings.

For Highrise buildings, we use to referrer maximum no of fixture to connected on each stack to be followed.

Slope

As per standard practice and guidelines slopes as follows.

TABLE 3.2
MINIMUM GRADES OF DRAINS

Nominal size DN	Minimum grade, %
65	2.50
80	1.65
100	1.65*
125	1.25
150	1.00
225	0.65
300	0.40

* Except for drains from septic tanks, sewage treatment plants and unvented discharge pipes from tundishes, which may have a minimum grade of 1.00%.

NOTE: Appendix B provides a Table for conversion of grades as a percentage to grades as a ratio.

TABLE 3.1
MAXIMUM FIXTURE UNIT LOADINGS FOR VENTED DRAINS

Grade, %	Nominal size of drain, DN					
	40 (1 1/2)	50 (2)	75 (3)	100 (4)	150 (6)	200 (8)
1.00	60	115	115	140	200	260
1.25	80	140	140	180	260	340
1.50	100	180	180	240	340	440
2.00	140	240	240	320	440	580
2.50	180	320	320	420	580	760
3.00	240	420	420	540	760	1000
3.75	320	540	540	680	1000	1300
4.50	420	680	680	860	1300	1700
5.00	480	760	760	960	1400	1800
5.50	540	860	860	1080	1500	1900
6.00	600	960	960	1200	1600	2000

NOTES:
1. DN-40 drains may be used in branch drains only, provided that no wet fixtures (except urinals) are connected thereto.
2. * indicates that the combination of nominal size and grade is not permitted.
3. Figures in brackets are the maximum fixture unit loadings for drains laid at reduced grades as permitted by Clause 3.4.2.

Vent Pipe Sizing

Individual fixtures vent connection to be developed based on the available and on the type of fixture and list as required.

And header connections to be followed as per standard table.

To calculate water supply pipe sizing, we use to follow standard fixture consideration inline with code and guidelines and equivalent flow to work out sizes. For individual circuit, we use to follow standard fixture sizes.

Fixture/appliance	Flow rate, L/s	Flow rate, L/min	Loading units
Water closet cistern	0.10	6	2
Bath	0.30	18	8
Basin (standard outfit)	0.10	6	1
Spray tap	0.03	1.8	0.5
Shower	0.10	6	6
Sink (standard tap)	0.12	7	3
Sink (sacred tap)	0.10	6	2
Laundry trough	0.12	7	7
Washing-machine/dishwasher	0.20	12	3
Mains pressure water heater	0.20	12	8
Hose tap (25 mm. size)	0.30	18	8
Hose tap (15 mm. size)	0.20	12	4

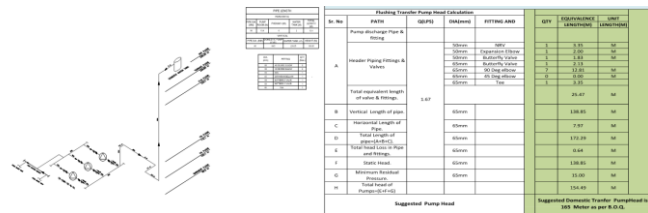
To work out the sizes for branch and header piping networks as per standard piping length, head loss and the table provided below.

No. of units or dwellings	Flow rate l/s	No. of units or dwellings	Flow rate l/s	No. of units or dwellings	Flow rate l/s
1	0.48	35	3.74	68	5.79
2	0.76	36	3.88	69	5.85
3	0.88	37	3.88	70	5.91
4	1.03	38	3.95	71	5.96
5	1.17	39	4.00	72	6.02
6	1.30	40	4.06	73	6.08
7	1.41	41	4.14	74	6.13
8	1.53	42	4.21	75	6.19
9	1.64	43	4.27	76	6.25
10	1.74	44	4.34	77	6.30
11	1.84	45	4.40	78	6.36
12	1.94	46	4.47	79	6.41
13	2.03	47	4.54	80	6.47
14	2.12	48	4.59	81	6.53
15	2.21	49	4.66	82	6.58
16	2.30	50	4.72	83	6.64

FIREHOLE GROUP - n = 30.00											
OVERSAMPLING											
Protein composition bias (p < 0.05)											
Protein	1	2	3	4	5	6	7	8	9	10	11
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	0.00	0.00	0.00	0.00							

We do the pump head calculation through detail piping route to evaluate horizontal and vertical distance with all required fitting.

And as per the code, we do summarize piping and fitting losses to complete the pump head calculation.



Access Point Type	Recommended Storage Element(s) & Size	
	Initial	Maintained
Kitchen/Bedrooms	200	400
Kitchen	100	50
Kitchen/Closet	100	50
Living/Dining	100	50
Bedroom	50	50
Bedroom	50	50
Entry/Locker/Clips	20	40

TABLE 4-1
RECOMMENDED INITIAL AND MAINTAINED ELECTRICAL INSTALLATIONS

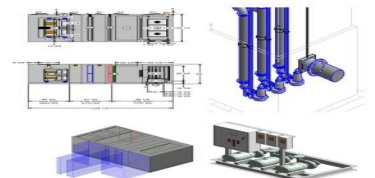
Component	Initial Electrical Installation	Maintained Electrical Installation	Notes
1. Kitchen	100	50	100% of initial and maintained electrical installations are required to be installed in the kitchen.
2. Living/Dining	100	50	100% of initial and maintained electrical installations are required to be installed in the living/dining area.
3. Bedroom	50	50	100% of initial and maintained electrical installations are required to be installed in the bedroom.
4. Entry/Locker/Clips	20	40	100% of initial and maintained electrical installations are required to be installed in the entry/locker/clips area.
5. Kitchen/Closet	100	50	100% of initial and maintained electrical installations are required to be installed in the kitchen/closet area.
6. Kitchen/Bedrooms	200	400	100% of initial and maintained electrical installations are required to be installed in the kitchen/bedrooms area.
7. Kitchen	100	50	100% of initial and maintained electrical installations are required to be installed in the kitchen area.
8. Kitchen/Closet	100	50	100% of initial and maintained electrical installations are required to be installed in the kitchen/closet area.
9. Living/Dining	100	50	100% of initial and maintained electrical installations are required to be installed in the living/dining area.
10. Bedroom	50	50	100% of initial and maintained electrical installations are required to be installed in the bedroom area.
11. Bedroom	50	50	100% of initial and maintained electrical installations are required to be installed in the bedroom area.
12. Entry/Locker/Clips	20	40	100% of initial and maintained electrical installations are required to be installed in the entry/locker/clips area.

Supply voltage
Single Phase 240 v
Three Phase 400 v

Based on the available power socket locations as provided by the interior architect and samples and standard requirement , demand load will be calculated to calculate breaker and cable sizes.

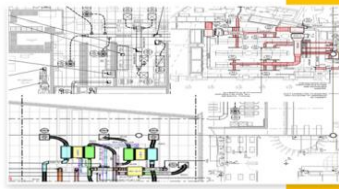
Room/Zone Type	Recommended Average Illuminance (lux)		TABLE C1 MAXIMUM DEMAND—SINGLE AND MULTIPLE COMMODITY ELECTRICAL INSTALLATIONS					
	Initial	Maintained	1		2		3	
			Load group		Effects of lighting controls ^{a,b}		Notes	
Kitchen/workbench	300	240	A. Light group		Single receptacle loads, 100 VA per ft ² per person		E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ	
Kitchen	300	240	A. Light group		Single receptacle loads, 100 VA per ft ² per person		E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ	
Kitchen/Living	300	240	A. Light group		Single receptacle loads, 100 VA per ft ² per person		E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ	
Living/Dining	300	240	A. Light group		Single receptacle loads, 100 VA per ft ² per person		E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ	
Bedroom	300	240	A. Light group		Single receptacle loads, 100 VA per ft ² per person		E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ	
Bathroom	300	240	A. Light group		Single receptacle loads, 100 VA per ft ² per person		E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ	
Entry/Corridor/Stairs	50	40	A. Light group		Single receptacle loads, 100 VA per ft ² per person		E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ	

Equipment Modeling



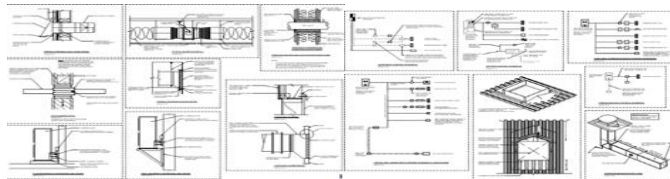
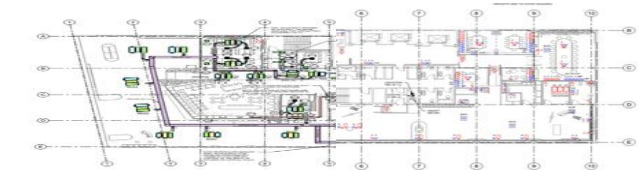


Design Drawing

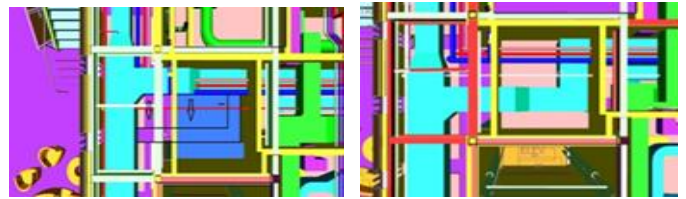


Design drawing set will have following list of drawing

1. Legend, Notes & Specification
2. Floor Plans
3. Schematic / Isometric
4. Detail Sheet
5. Schedule



Clashes are resolved through video conference discussion regarding the 3D clash snapshot and multiple fix options such as rerouting utilities, changing elevations, and resizing. Value engineering is also utilized to improve system efficiency, reduce costs, and provide for more efficient construction and maintenance.



Bill of Material (Quantity Take off)

QUANTITY TAKE OFF								
CATEGORY	MATERIAL	SYSTEM	GAUGE	SIZE	JOINT1	JOINT2	LENGTH	QTY
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	300X150	17.2	17.2	4000	1
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	750X750	17.2	17.2	4000	1
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	750X650	17.2	17.2	4000	1
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	800X450	17.2	17.2	4000	1
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	750X500	17.2	17.2	4000	1
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	300X100	17.2	17.2	4000	1
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	300X50	17.2	17.2	4000	1
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	300X50	17.2	17.2	4000	1
Rectangular Straight Duct	GALVANIZED	GAL M.P.M.F.T.	28	300X50	17.2	17.2	4000	1

Quantities can be generated for a specific time or project area (4D/5D) to help manage material procurement and save inventory costs. It is an automated procedure on the MEP model is 100% accurate as per the design.

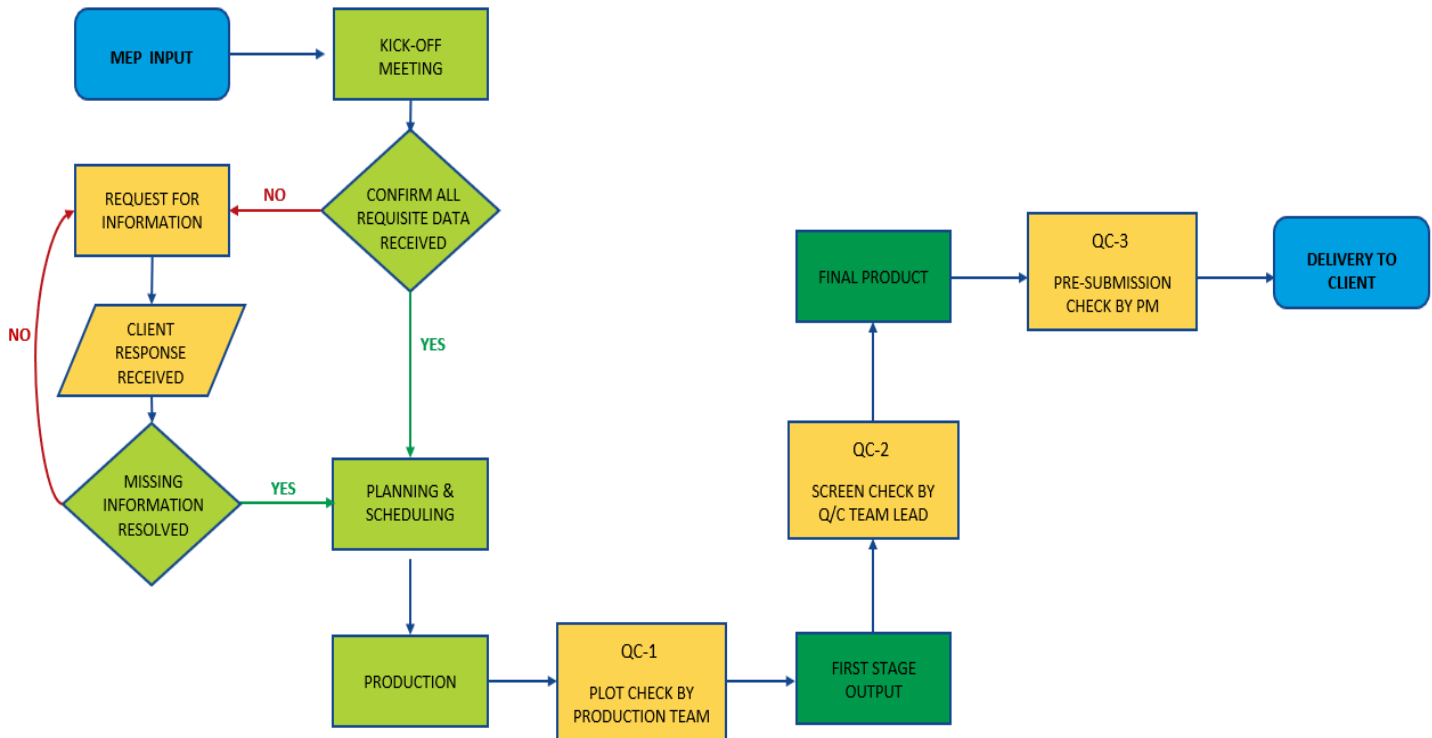
Still many clients are using AutoCAD to produce design drawings in CAD. Based on the mark-ups, reference drawing, we produce the design drawing for MEP system and work out the detail branch duct, pipe sizes as per the schematic and produce the complete design drawings /Tender Drawing or Construction drawing in CAD.

Qty Take Off:

Quantity Take-Off (QTO) reports will in MS Excel for detailed analysis and estimation purpose.

QTY	UNIT NO	Plating Size				S/R Brand				REMARKS
		1.5	2	3	4	2"	3"	4"	5"	
1	A1.2	0	600	600	600	0	0	12	6	1
2	A1.3	0	600	600	600	0	0	12	6	1
3	A1.4	0	600	600	600	0	0	12	6	1
4	A2.2	0	600	600	600	0	0	12	6	1
5	A2.3	0	600	600	600	0	0	12	6	1
6	A2.4	0	600	600	600	0	0	12	6	1
7	A3.2	0	600	600	600	0	0	12	6	1
8	A3.3	0	600	600	600	0	0	12	6	1
9	A3.4	0	600	600	600	0	0	12	6	1
10	A4.2	0	600	600	600	0	0	12	6	1
11	A4.3	0	600	600	600	0	0	12	6	1
12	A4.4	0	600	600	600	0	0	12	6	1
13	B1.2	0	600	600	600	0	0	12	6	1
14	B1.3	0	600	600	600	0	0	12	6	1
15	B1.4	0	600	600	600	0	0	12	6	1
16	B2.2	0	600	600	600	0	0	12	6	1
17	B2.3	0	600	600	600	0	0	12	6	1
18	B2.4	0	600	600	600	0	0	12	6	1
19	B3.2	0	600	600	600	0	0	12	6	1
20	B3.3	0	600	600	600	0	0	12	6	1
21	B3.4	0	600	600	600	0	0	12	6	1
22	B4.2	0	600	600	600	0	0	12	6	1
23	B4.3	0	600	600	600	0	0	12	6	1
24	B4.4	0	600	600	600	0	0	12	6	1
25	B5.2	0	600	600	600	0	0	12	6	1
26	B5.3	0	600	600	600	0	0	12	6	1
27	B5.4	0	600	600	600	0	0	12	6	1
28	B6.2	0	600	600	600	0	0	12	6	1
29	B6.3	0	600	600	600	0	0	12	6	1
30	B6.4	0	600	600	600	0	0	12	6	1
31	C1.1	0	600	600	600	0	0	12	6	1
32	C1.2	0	600	600	600	0	0	12	6	1
33	C1.3	0	600	600	600	0	0	12	6	1
34	C1.4	0	600	600	600	0	0	12	6	1
35	C2.1	0	600	600	600	0	0	12	6	1
36	C2.2	0	600	600	600	0	0	12	6	1
37	C2.3	0	600	600	600	0	0	12	6	1
38	C2.4	0	600	600	600	0	0	12	6	1
39	C3.1	0	600	600	600	0	0	12	6	1
40	C3.2	0	600	600	600	0	0	12	6	1
41	C3.3	0	600	600	600	0	0	12	6	1
42	C3.4	0	600	600	600	0	0	12	6	1
43	C4.1	0	600	600	600	0	0	12	6	1
44	C4.2	0	600	600	600	0	0	12	6	1
45	C4.3	0	600	600	600	0	0	12	6	1
46	C4.4	0	600	600	600	0	0	12	6	1
47	C5.1	0	600	600	600	0	0	12	6	1
48	C5.2	0	600	600	600	0	0	12	6	1
49	C5.3	0	600	600	600	0	0	12	6	1
50	C5.4	0	600	600	600	0	0	12	6	1
51	C6.1	0	600	600	600	0	0	12	6	1
52	C6.2	0	600	600	600	0	0	12	6	1
53	C6.3	0	600	600	600	0	0	12	6	1
54	C6.4	0	600	600	600	0	0	12	6	1
55	C7.1	0	600	600	600	0	0	12	6	1
56	C7.2	0	600	600	600	0	0	12	6	1
57	C7.3	0	600	600	600	0	0	12	6	1
58	C7.4	0	600	600	600	0	0	12	6	1
59	C8.1	0	600	600	600	0	0	12	6	1
60	C8.2	0	600	600	600	0	0	12	6	1
61	C8.3	0	600	600	600	0	0	12	6	1
62	C8.4	0	600	600	600	0	0	12	6	1
63	C9.1	0	600	600	600	0	0	12	6	1
64	C9.2	0	600	600	600	0	0	12	6	1
65	C9.3	0	600	600	600	0	0	12	6	1
66	C9.4	0	600	600	600	0	0	12	6	1
67	C10.1	0	600	600	600	0	0	12	6	1
68	C10.2	0	600	600	600	0	0	12	6	1
69	C10.3	0	600	600	600	0	0	12	6	1
70	C10.4	0	600	600	600	0	0	12	6	1
71	C11.1	0	600	600	600	0	0	12	6	1
72	C11.2	0	600	600	600	0	0	12	6	1
73	C11.3	0	600	600	600	0	0	12	6	1
74	C11.4	0	600	600	600	0	0	12	6	1
75	C12.1	0	600	600	600	0	0	12	6	1
76	C12.2	0	600	600	600	0	0	12	6	1
77	C12.3	0	600	600	600	0	0	12	6	1
78	C12.4	0	600	600	600	0	0	12	6	1
79	C13.1	0	600	600	600	0	0	12	6	1
80	C13.2	0	600	600	600	0	0	12	6	1
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82	C13.4	0	600	600	600	0	0	12	6	1
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84	C14.2	0	600	600	600	0	0	12	6	1
85	C14.3	0	600	600	600	0	0	12	6	1
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105	C19.3	0	600	600	600	0	0	12	6	1
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117	C22.3	0	600	600	600	0	0	12	6	1
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121	C23.3	0	600	600	600	0	0	12	6	1
122	C23.4	0	600	600	600	0	0	12	6	1
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144	C29.2	0	600	600	600	0	0	12	6	1
145	C29.3	0	600	600	600	0	0	12	6	1
146	C29.4	0	600	600	600	0	0	12	6	1
147	C30.1	0	600	600	600	0	0	12	6	1
148	C30.2	0	600	600	600	0	0	12	6	1
149	C30.3	0	600	600	600	0	0	12	6	1
150	C30.4	0	600	600	600	0	0	12	6	1
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152	C31.2	0	600	600	600	0	0			

Execution Process



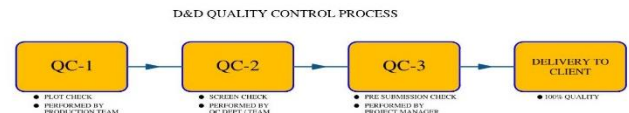
We use to implement our standard BIM/CAD execution process to deliver each and every project.

Stage 1: - We do kickoff meeting with our client for better understanding of the project to start.

Stage2: - We do project review, planning and prepare project specification checklist and delivery schedule and share with client.

Stage3: - We allocate our dedicated Team lead with team member inline with the services to start the production activities as per delivery schedule.

Final Stage: - We follow QC process in the execution process before delivered to the client. With the above process, we deliver the high-quality product to client.



Quality Check – 1

The model check is done comparing it with the original contract documents through Team Member.

Quality Check – 2

Team performs a more detailed comparison with specific checklist and project checklist the deliverables and main objective check the following Clashes (Old/New), Elevation, Routing, Fittings, etc. Construction point of view.

Quality Check – 3

The Project manager conducts the pre- shipment check before sending them to client.

Core Team

Irshad Ali Shaikh **CEO – Co-Founder**

Mr. Irshad Ali is the co-owner & founder of DESIGN AND DRAWING SOLUTION. He is having more than 15 years of experience in Building services in construction Industry throughout AEC project execution process from Pre-construction, construction Processes like MEP engineering consulting, Designing, installation and handover process of the project.

He has completed BE in Mechanical Engineering from Pune University with Post Graduation in Project Management (PGPPM) from NICMAR Pune, India. In his small journey, he has successfully delivered the more than hundred BIM/CAD project for his satisfied client with the best quality and unique team effort.

He has experienced in all kinds of projects i.e., starting from Residential township, Commercial IT buildings and parks, Malls, High rise building, Hotel, Hospital & Institutional building. Including building Infrastructure projects like metro, airports, globally i.e. USA, Australia, New Zealand & India.

Karishma Bibi **Sales Head**

She is the co-owner of DESIGN AND DRAWING SOLUTION and well experienced in offshore sales development initiatives. She is having a good knowledge of result-oriented sales development processes and customer retention. She is leading the complete sales team for B2B sales within the company and managing and monitoring the effectiveness of the entire sales cycle. She has implemented her interior design expertise to improve the technical expertise for client communication for offshore sales which helps her build a long-term relationship with new and existing clientele.

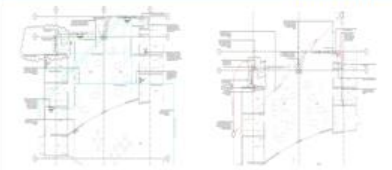

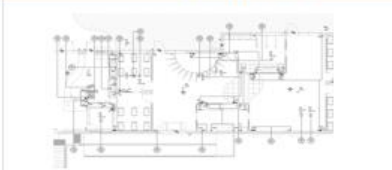
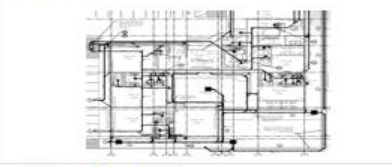


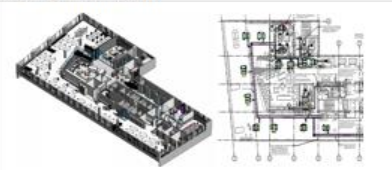


Rupam Mondal **Production Manager**

He holds a Mechanical Engineering diploma from WBSCTE, India and having more than 7 years' experience in Building construction Industry for MEP engineering, Drafting, of 3D, 4D, 5D & 6D BIM service.

He is having expertise in MEP engineering calculation, with all Autodesk BIM/CAD tools like Revit, Fabrication, AutoCAD MEP, Navis works and AutoCAD and has complete knowledge of engineering and drafting services for all stages (Pre/post) of construction process.

He is working in DESIGNING AND DRAWING SOLUTION since from starting period of the company. With a short period of time, He has gained the managing process of the company, client communication, project management process and assisting with innovative (R & D) solution of new process, tools for new requirement of clients.

Project References

Mechanical & Plumbing		ELECTRICAL
 <p>St Mary's Hamilton 49 Hiller Lane, Hamilton Australia School</p>	 <p>The Abbotsford stage 2 Bowen Hills Australia Apartment</p>	 <p>Pimpama Childcare PIMPAMA QLD 4209 Australia School Building</p>
 <p>Jimboomba childcare River street Australia School building</p>	 <p>Kokowai Auckland New Zealand Apartment</p>	 <p>Oakland Way Childcare PIMPAMA QLD 4209 Australia School Building</p>
 <p>Accenture fit out Auckland New Zealand Restaurant</p>	 <p>Favona Favona New Zealand Ware house</p>	 <p>Logan Village 36-38 River St, QLD 4207 Australia School Building</p>

Contact US

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