1. Extended ER

```
CREATE TABLE clientzip (
    zip     CHAR(5) NOT NULL,
    city    VARCHAR(45),
    "state"   VARCHAR(45)
);

ALTER TABLE clientzip ADD CONSTRAINT zip_pk PRIMARY KEY ( zip );

CREATE TABLE client (
    accountnum   CHAR(8) NOT NULL,
    name         VARCHAR(45),
    streetnum    VARCHAR(7),
    streetname   VARCHAR(100),
    zip          CHAR(5) NOT NULL
);

ALTER TABLE client ADD CONSTRAINT client_pk PRIMARY KEY ( accountnum );

ALTER TABLE client
    ADD CONSTRAINT client_zip_fk FOREIGN KEY ( zip )
        REFERENCES clientzip ( zip );

CREATE TABLE contact (
    contactid    CHAR(16) NOT NULL,
    fname        VARCHAR(30),
    lname        VARCHAR(30),
    telnum       CHAR(10),
    accountnum   CHAR(8) NOT NULL
);

ALTER TABLE contact ADD CONSTRAINT contact_pk PRIMARY KEY ( contactid );

ALTER TABLE contact
    ADD CONSTRAINT contact_client_fk FOREIGN KEY ( accountnum )
        REFERENCES client ( accountnum );

CREATE TABLE project (
    projectnum   CHAR(8) NOT NULL,
    projname     VARCHAR(45),
    streetnum    VARCHAR(7),
    streetname   VARCHAR(100),
    zip          CHAR(5),
    city         VARCHAR(45),
    "state"        CHAR(2),
    accountnum   CHAR(8) NOT NULL,
    contactid    CHAR(16) NOT NULL,
    zipclient    CHAR(5) NOT NULL
);

ALTER TABLE project ADD CONSTRAINT project_pk PRIMARY KEY ( projectnum );

ALTER TABLE project
    ADD CONSTRAINT project_client_fk FOREIGN KEY ( accountnum )
        REFERENCES client ( accountnum );

ALTER TABLE project
    ADD CONSTRAINT project_contact_fk FOREIGN KEY ( contactid )
        REFERENCES contact ( contactid );

ALTER TABLE project
    ADD CONSTRAINT project_zip_fk FOREIGN KEY ( zipclient )
```

```
        REFERENCES clientzip ( zip );


CREATE TABLE designbid (
    projectnum          CHAR(8) NOT NULL,
    bidversion          CHAR(2) NOT NULL,
    biddate             DATE,
    estbegindate        DATE,
    estcompletiondate   DATE,
    bidammmount         DECIMAL
);

ALTER TABLE designbid ADD CONSTRAINT designbid_pk PRIMARY KEY ( projectnum,
                                                                bidversion );

ALTER TABLE designbid
    ADD CONSTRAINT table_6_project_fk FOREIGN KEY ( projectnum )
        REFERENCES project ( projectnum );

CREATE TABLE material (
    materialcode   CHAR(8) NOT NULL,
    mtype          VARCHAR(10) NOT NULL,
    [description]    VARCHAR(50),
    "size"         DECIMAL,
    sizeunits      VARCHAR(10)
);

ALTER TABLE material ADD CONSTRAINT material_pk PRIMARY KEY ( materialcode,
                                                              mtype );

CREATE TABLE "Bid Materials" (
    projectnum           CHAR(8) NOT NULL,
    bidversion           CHAR(2) NOT NULL,
    materialcode         CHAR(8) NOT NULL,
    mtype                VARCHAR(10) NOT NULL,
    bidqty               INTEGER NOT NULL,
    bidunitprice         DECIMAL,
    "BID-MATERIALScol"   VARCHAR(45)
);

ALTER TABLE "Bid Materials"
    ADD CONSTRAINT "Bid Materials_PK" PRIMARY KEY ( projectnum,
                                                    bidversion,
                                                    materialcode,
                                                    mtype );

ALTER TABLE "Bid Materials"
    ADD CONSTRAINT "Bid Materials_DesignBid_FK" FOREIGN KEY ( projectnum,
                                                              bidversion )
        REFERENCES designbid ( projectnum,
                               bidversion );

ALTER TABLE "Bid Materials"
    ADD CONSTRAINT "Bid Materials_Material_FK" FOREIGN KEY ( materialcode,
                                                             mtype )
        REFERENCES material ( materialcode,
                              mtype );
CREATE TABLE staff (
    emplid   CHAR(4) NOT NULL,
    lname    VARCHAR(45),
    fname    VARCHAR(45),
    tel      CHAR(10)
);

ALTER TABLE staff ADD CONSTRAINT staff_pk PRIMARY KEY ( emplid );
```

```
CREATE TABLE "Bid Staff" (
    emplid       CHAR(4) NOT NULL,
    bidversion   CHAR(2) NOT NULL,
    projectnum   CHAR(8) NOT NULL,
    "role"         VARCHAR(45)
);

ALTER TABLE "Bid Staff"
    ADD CONSTRAINT "Bid Staff_PK" PRIMARY KEY ( emplid,
                                                bidversion,
                                                projectnum );

ALTER TABLE "Bid Staff"
    ADD CONSTRAINT "Bid Staff_DesignBid_FK" FOREIGN KEY ( projectnum,
                                                          bidversion )
        REFERENCES designbid ( projectnum,
                               bidversion );

ALTER TABLE "Bid Staff"
    ADD CONSTRAINT "Bid Staff_Staff_FK" FOREIGN KEY ( emplid )
        REFERENCES staff ( emplid );

CREATE TABLE labor (
    laborcode          CHAR(6) NOT NULL,
    labordescription   VARCHAR(60),
    chargerate         DECIMAL
);

ALTER TABLE labor ADD CONSTRAINT labor_pk PRIMARY KEY ( laborcode );

CREATE TABLE "Bid Labor" (
    laborcode       CHAR(6) NOT NULL,
    projectnum      CHAR(8) NOT NULL,
    bidversion      CHAR(2) NOT NULL,
    bidhours        INTEGER,
    laborunitcost   DECIMAL
);

ALTER TABLE "Bid Labor"
    ADD CONSTRAINT "Bid Labor_PK" PRIMARY KEY ( laborcode,
                                                bidversion,
                                                projectnum );

ALTER TABLE "Bid Labor"
    ADD CONSTRAINT "Bid Labor_DesignBid_FK" FOREIGN KEY ( projectnum,
                                                          bidversion )
        REFERENCES designbid ( projectnum,
                               bidversion );

ALTER TABLE "Bid Labor"
    ADD CONSTRAINT "Bid Labor_Labor_FK" FOREIGN KEY ( laborcode )
        REFERENCES labor ( laborcode );

CREATE TABLE supplier (
    supplierid     CHAR(8) NOT NULL,
    suppliername   VARCHAR(60),
    streetnum      VARCHAR(8),
    streetname     VARCHAR(100),
    city           VARCHAR(45),
    statecode      CHAR(2),
    telnum         CHAR(10)
);

ALTER TABLE supplier ADD CONSTRAINT supplier_pk PRIMARY KEY ( supplierid );
```

```
CREATE TABLE purchaseorder (
    po_num       CHAR(10) NOT NULL,
    po_date      DATE,
    taxammount   DECIMAL,
    supplierid   CHAR(8) NOT NULL
);

ALTER TABLE purchaseorder ADD CONSTRAINT purchaseorder_pk PRIMARY KEY ( po_num );

ALTER TABLE purchaseorder
    ADD CONSTRAINT purchaseorder_supplier_fk FOREIGN KEY ( supplierid )
        REFERENCES supplier ( supplierid );

CREATE TABLE "Preffered Plant Supplier" (
    materialcode       CHAR(8) NOT NULL,
    mtype              VARCHAR(10) NOT NULL,
    pref_supplierid    CHAR(8) NOT NULL,
    pref2_supplierid   CHAR(8) NOT NULL,
    pref1_leadtime     INTEGER NOT NULL,
    pref2_leadtime     INTEGER NOT NULL
);

ALTER TABLE "Preffered Plant Supplier"
    ADD CONSTRAINT "Preffered Plant Supplier_PK" PRIMARY KEY ( materialcode,
                                                               mtype,
                                                               pref_supplierid,
                                                               pref2_supplierid );

ALTER TABLE "Preffered Plant Supplier"
    ADD CONSTRAINT "Preffered Plant " FOREIGN KEY ( pref2_supplierid )
        REFERENCES supplier ( supplierid );

ALTER TABLE "Preffered Plant Supplier"
    ADD CONSTRAINT "Preffered Plant Supplier_FK" FOREIGN KEY ( materialcode,
                                                               mtype )
        REFERENCES material ( materialcode,
                              mtype );

ALTER TABLE "Preffered Plant Supplier"
    ADD CONSTRAINT "Preffered Plant Sur_FK" FOREIGN KEY ( pref_supplierid )
        REFERENCES supplier ( supplierid );


CREATE TABLE "PO Materials" (
    materialcode   CHAR(8) NOT NULL,
    mtype          VARCHAR(10) NOT NULL,
    po_num         CHAR(10) NOT NULL,
    quantity       INTEGER,
    unitprice      DECIMAL
);

ALTER TABLE "PO Materials"
    ADD CONSTRAINT "PO Materials_PK" PRIMARY KEY ( materialcode,
                                                   mtype,
                                                   po_num );

ALTER TABLE "PO Materials"
    ADD CONSTRAINT "PO Materials_Material_FK" FOREIGN KEY ( materialcode,
                                                            mtype )
        REFERENCES material ( materialcode,
                              mtype );

ALTER TABLE "PO Materials"
```

```
    ADD CONSTRAINT "PO Materials_Purchase_FK" FOREIGN KEY ( po_num )
        REFERENCES purchaseorder ( po_num );


CREATE TABLE invoice (
    invoiceno     CHAR(10) NOT NULL,
    invoicedate   DATE,
    shipdate      DATE,
    notes         VARCHAR(256),
    po_num        CHAR(10) NOT NULL
);

ALTER TABLE invoice ADD CONSTRAINT invoice_pk PRIMARY KEY ( invoiceno );

ALTER TABLE invoice
    ADD CONSTRAINT "Invoice_Purchase Order_FK" FOREIGN KEY ( po_num )
        REFERENCES purchaseorder ( po_num );

CREATE TABLE "Invoice Materials" (
    materialcode   CHAR(8) NOT NULL,
    mtype          VARCHAR(10) NOT NULL,
    invoiceno      CHAR(10) NOT NULL,
    qty            INTEGER,
    unitprice      DECIMAL
);

ALTER TABLE "Invoice Materials"
    ADD CONSTRAINT "Invoice Materials_PK" PRIMARY KEY ( materialcode,
                                                        mtype,
                                                        invoiceno );

ALTER TABLE "Invoice Materials"
    ADD CONSTRAINT "Invoice Materials_FK" FOREIGN KEY ( materialcode,
                                                        mtype )
        REFERENCES material ( materialcode,
                              mtype );

ALTER TABLE "Invoice Materials"
    ADD CONSTRAINT "Invoice Materials_FKv2" FOREIGN KEY ( invoiceno )
        REFERENCES invoice ( invoiceno );

CREATE TABLE "Production Plan" (
    pplanid      CHAR(8) NOT NULL,
    bidversion   CHAR(2) NOT NULL,
    projectnum   CHAR(8) NOT NULL,
    begdate      DATE,
    compldate    DATE
);

ALTER TABLE "Production Plan" ADD CONSTRAINT "Production Plan_PK" PRIMARY KEY ( pplanid
);

ALTER TABLE "Production Plan"
    ADD CONSTRAINT "Production Plan_DesignBid_FK" FOREIGN KEY ( projectnum,
                                                               bidversion )
        REFERENCES designbid ( projectnum,
                               bidversion );

CREATE TABLE productionlabor (
    laborcode    CHAR(6) NOT NULL,
    pplanid      CHAR(8) NOT NULL,
    "Cost/Hr"    DECIMAL,
    [time]         DATE,
    task         VARCHAR(20),
    [hours]        INTEGER
```

```
);

ALTER TABLE productionlabor ADD CONSTRAINT productionlabor_pk PRIMARY KEY ( laborcode );

ALTER TABLE productionlabor
    ADD CONSTRAINT productionlabor_labor_fk FOREIGN KEY ( laborcode )
        REFERENCES labor ( laborcode );

ALTER TABLE productionlabor
    ADD CONSTRAINT "Production Plan_FK" FOREIGN KEY ( pplanid )
        REFERENCES "Production Plan" ( pplanid );


CREATE TABLE productionplanmaterial (
    pplanid        CHAR(8) NOT NULL,
    materialcode   CHAR(8) NOT NULL,
    mtype          VARCHAR(10) NOT NULL,
    qty            INTEGER,
    "Net/Unit"     DECIMAL,
    deliver        DATE,
    install        DATE
);

ALTER TABLE productionplanmaterial
    ADD CONSTRAINT productionplanmaterial_pk PRIMARY KEY ( mtype,
                                                           pplanid,
                                                           materialcode );

ALTER TABLE productionplanmaterial
    ADD CONSTRAINT productionplanmaterial_fk FOREIGN KEY ( pplanid )
        REFERENCES "Production Plan" ( pplanid );

ALTER TABLE productionplanmaterial
    ADD CONSTRAINT productionplanmateriall_fk FOREIGN KEY ( materialcode,
                                                            mtype )
        REFERENCES material ( materialcode,
                              mtype );

CREATE TABLE tools (
    toolid     CHAR(8) NOT NULL,
    toolname   VARCHAR(15)
);

ALTER TABLE tools ADD CONSTRAINT tools_pk PRIMARY KEY ( toolid );


CREATE TABLE prodplantools (
    pplanid        CHAR(8) NOT NULL,
    toolid         CHAR(8) NOT NULL,
    qty            INTEGER,
    deliverydate   DATE
);

ALTER TABLE prodplantools ADD CONSTRAINT prodplantools_pk PRIMARY KEY ( pplanid,
                                                                        toolid );

ALTER TABLE prodplantools
    ADD CONSTRAINT prodplantools_fk FOREIGN KEY ( pplanid )
        REFERENCES "Production Plan" ( pplanid );

ALTER TABLE prodplantools
    ADD CONSTRAINT prodplantools_tools_fk FOREIGN KEY ( toolid )
        REFERENCES tools ( toolid );

CREATE TABLE productionteam (
```

```
    pplanid   CHAR(8) NOT NULL,
    emplid    CHAR(4) NOT NULL,
    [role]      VARCHAR(20)
);

ALTER TABLE productionteam ADD CONSTRAINT productionteam_pk PRIMARY KEY ( pplanid );

ALTER TABLE productionteam
    ADD CONSTRAINT "TABLE_41_Production Plan_FK" FOREIGN KEY ( pplanid )
        REFERENCES "Production Plan" ( pplanid );

ALTER TABLE productionteam
    ADD CONSTRAINT table_41_staff_fk FOREIGN KEY ( emplid )
        REFERENCES staff ( emplid );

CREATE TABLE pdwr (
    pplanid       CHAR(8) NOT NULL,
    pdwrversion   CHAR(8) NOT NULL,
    "Date"        DATE,
    submission    CHAR(4) NOT NULL,
    projectnum    CHAR(8) NOT NULL
);

ALTER TABLE pdwr ADD CONSTRAINT pdwr_pk PRIMARY KEY ( pdwrversion );

ALTER TABLE pdwr
    ADD CONSTRAINT "PDWR_Production Plan_FK" FOREIGN KEY ( pplanid )
        REFERENCES "Production Plan" ( pplanid );

ALTER TABLE pdwr
    ADD CONSTRAINT "PDWR Project FK" FOREIGN KEY ( projectnum )
        REFERENCES "project" ( projectnum );


ALTER TABLE pdwr
    ADD CONSTRAINT pdwr_staff_fk FOREIGN KEY ( submission )
        REFERENCES staff ( emplid );

CREATE TABLE pdwrlabor (
    pdwrversion   CHAR(8) NOT NULL,
    laborcode     CHAR(6) NOT NULL,
    [hours]         INTEGER,
    "Cost/Hr"     DECIMAL,
    task          VARCHAR(20),
    worker        CHAR(4) NOT NULL
);

ALTER TABLE pdwrlabor ADD CONSTRAINT pdwrlabor_pk PRIMARY KEY ( pdwrversion,
                                                                laborcode );

ALTER TABLE pdwrlabor
    ADD CONSTRAINT pdwrlabor_labor_fk FOREIGN KEY ( laborcode )
        REFERENCES labor ( laborcode );

ALTER TABLE pdwrlabor
    ADD CONSTRAINT pdwrlabor_pdwr_fk FOREIGN KEY ( pdwrversion )
        REFERENCES pdwr ( pdwrversion );

ALTER TABLE pdwrlabor
    ADD CONSTRAINT pdwrlabor_staff_fk FOREIGN KEY ( worker )
        REFERENCES staff ( emplid );

CREATE TABLE pdwrmaterials (
    materialcode   CHAR(8) NOT NULL,
    mtype          VARCHAR(10) NOT NULL,
```

```
    unitcost        DECIMAL,
    qty             INTEGER,
    pdwrversion     CHAR(8) NOT NULL,
    approval        CHAR(4) NOT NULL

);

ALTER TABLE pdwrmaterials
    ADD CONSTRAINT pdwrmaterials_pk PRIMARY KEY ( mtype,
                                                  materialcode,
                                                  pdwrversion );

ALTER TABLE pdwrmaterials
    ADD CONSTRAINT pdwrmaterials_material_fk FOREIGN KEY ( materialcode,
                                                           mtype )
        REFERENCES material ( materialcode,
                              mtype );

ALTER TABLE pdwrmaterials
    ADD CONSTRAINT pdwrmaterials_pdwr_fk FOREIGN KEY ( pdwrversion )
        REFERENCES pdwr ( pdwrversion );

ALTER TABLE pdwrmaterials
    ADD CONSTRAINT pdwrmaterials_staff_fk FOREIGN KEY ( approval )
        REFERENCES staff ( emplid );
```

2. Check Constraints

```
ALTER TABLE clientzip
       ADD
       CONSTRAINT CHK_CLIENTZIPZIP
              CHECK(zip LIKE '[A-Z0-9][A-Z0-9][A-Z0-9][A-Z0-9][A-Z0-9]')
       , CONSTRAINT CHK_STATE
              CHECK(state LIKE '[A-Z][A-Z]');

ALTER TABLE contact
       ADD
       CONSTRAINT CHK_fname
              CHECK(fname NOT LIKE '%[^A-Z]%')
       , CONSTRAINT CHK_lname
              CHECK(lname NOT LIKE '%[^A-Z]%')
       , CONSTRAINT CHK_telnum
              CHECK(telnum NOT LIKE '%[^0-9]%')
       , CONSTRAINT CHK_accountnum
              CHECK(accountnum NOT LIKE '%[^0-9]%');

ALTER TABLE project
       ADD
       CONSTRAINT CHK_ProjectZIP
              CHECK(zip LIKE '[A-Z0-9][A-Z0-9][A-Z0-9][A-Z0-9][A-Z0-9]')
       , CONSTRAINT CHK_projstreetname
              CHECK(streetname NOT LIKE '%[^A-Z]%')
       , CONSTRAINT CHK_projstreetnum
              CHECK(streetnum NOT LIKE '%[^A-Z0-9]%')
       , CONSTRAINT CHK_projst
              CHECK([state] LIKE '[A-Z][A-Z]')
       , CONSTRAINT CHK_projectnum
              CHECK(projectnum NOT LIKE '%[^0-9]%');

ALTER TABLE designbid
       ADD
       CONSTRAINT CHK_designtime
              CHECK(estbegindate <= estcompletiondate)
```

```
       , CONSTRAINT CHK_desbidamount
              CHECK(bidammmount >= 0)
       , CONSTRAINT CHK_desprojnum
              CHECK(projectnum NOT LIKE '%[^0-9]%');

ALTER TABLE "Bid Materials"
       ADD
CONSTRAINT CHK_materialqty
              CHECK(bidqty > 0)
       , CONSTRAINT CHK_bidunitprice
              CHECK(bidunitprice >= 0);

ALTER TABLE "Bid Labor"
       ADD CONSTRAINT CHK_laborhr
              CHECK(bidhours >= 0)
       , CONSTRAINT CHK_laborcost
              CHECK([laborunitcost] >= 0);

ALTER TABLE "Bid Staff"
       ADD CONSTRAINT CHK_staffrole
              CHECK([role] NOT LIKE '%[^A-Z]%');

ALTER TABLE staff
       ADD
       CONSTRAINT CHK_staffname
              CHECK(fname NOT LIKE '%[^A-Z]%')
       , CONSTRAINT CHK_stafflname
              CHECK(lname NOT LIKE '%[^A-Z]%')
       , CONSTRAINT CHK_stafftel
              CHECK(tel NOT LIKE '%[^0-9]%');

ALTER TABLE labor
       ADD
       CONSTRAINT CHK_laborchargerate
              CHECK([chargerate] > 0);

ALTER TABLE material
       ADD
       CONSTRAINT CHK_materialsize
              CHECK(size > 0);

ALTER TABLE [PO Materials]
       ADD
       CONSTRAINT CHK_pomatqty
              CHECK([quantity] > 0)
, CONSTRAINT CHK_pomatprice
              CHECK([unitprice] > 0);

ALTER TABLE [Invoice Materials]
       ADD
       CONSTRAINT CHK_invoicematqty
              CHECK([qty] >= 0)
, CONSTRAINT CHK_invoicematpr
              CHECK([unitprice] > 0);

ALTER TABLE [supplier]
       ADD
       CONSTRAINT CHK_namesupplier
              CHECK(suppliername NOT LIKE '%[^A-Z]%')
, CONSTRAINT CHK_STATESUP
              CHECK([statecode] LIKE '[A-Z][A-Z]')
       , CONSTRAINT CHK_telnumsupp
              CHECK(telnum NOT LIKE '%[^0-9]%')
       , CONSTRAINT CHK_supstreetname
              CHECK(streetname NOT LIKE '%[^A-Z]%')
```

```
       , CONSTRAINT CHK_supstreetnum
              CHECK(streetnum NOT LIKE '%[0-9]%');

ALTER TABLE productionplanmaterial
       ADD
       CONSTRAINT CHK_prmatqty
              CHECK(qty >= 0)
, CONSTRAINT CHK_produnitprice
              CHECK([Net/Unit] > 0)
, CONSTRAINT CHK_prodinstall
              CHECK([deliver] <= [install]);

ALTER TABLE productionlabor
       ADD
       CONSTRAINT CHK_prlabhr
              CHECK([hours] >= 0)
, CONSTRAINT CHK_prodlabcost
              CHECK([Cost/Hr] > 0);

ALTER TABLE [Production Plan]
       ADD
       CONSTRAINT CHK_prodbegcompldate
              CHECK([begdate] <= [compldate]);

ALTER TABLE [prodplantools]
       ADD
       CONSTRAINT CHK_prplantoolqty
              CHECK(qty >= 0);

ALTER TABLE pdwrmaterials
       ADD
       CONSTRAINT CHK_pdwrmatqty
              CHECK(qty >= 0)
, CONSTRAINT CHK_pdwrmatunitc
              CHECK([unitcost] > 0);

ALTER TABLE pdwrlabor
       ADD
       CONSTRAINT CHK_pdwrlaborhours
              CHECK([hours] >= 0)
, CONSTRAINT CHK_pdwrlaborcosthr
              CHECK([Cost/Hr] > 0)
```

3. Views

```
CREATE VIEW View_DesignBid

AS

SELECT Client.[Client Address], Client.[Client Name], Client.Contact, Client.telnum,
       Project.bidammmount, Project.biddate, Project.estbegindate,
Project.estcompletiondate, Project.[Project Site],
         [NBD Staff].[role], [NBD Staff].[Staff Name], [NBD Staff].tel,
         Material.bidqty, Material.bidunitprice, Material.[description], Material.Size,
Material.[Ext.Price],
         [Labor Requrements].bidhours, [Labor Requrements].labordescription, [Labor
Requrements].laborunitcost, [Labor Requrements].[Extended Price]
FROM(SELECT c.accountnum, c.name AS [Client Name], CONCAT(c.streetname,
', ',c.streetnum,
', ',c.zip)AS [Client Address],  CONCAT(CO.fname,
', ',CO.lname)AS [Contact], CO.telnum
FROM client AS c join contact as CO on c.accountnum = CO.accountnum) AS Client LEFT JOIN
```

```
(SELECT p.accountnum, d.bidammmount, d.biddate, d.estbegindate, d.estcompletiondate,
CONCAT(p.streetname,
', ',p.streetnum,
', ',p.zip)AS [Project Site], p.projectnum
 FROM project AS p join designbid AS d ON p.projectnum = d.projectnum) AS Project ON
Client.accountnum = Project.accountnum LEFT JOIN

 (SELECT BS.[role], CONCAT(S.fname,
', ', S.lname) AS [Staff Name], S.tel, BS.projectnum
  FROM [Bid Staff] AS BS join staff AS S on BS.emplid = s.emplid) AS [NBD Staff] ON [NBD
Staff].projectnum = Project.projectnum LEFT JOIN

  (SELECT BM.bidqty, BM.bidunitprice, M.[description], CONCAT(M.size,
', ', M.sizeunits) AS [Size], BM.projectnum, (BM.bidqty * BM.bidunitprice) AS [Ext.Price]
   FROM material AS M JOIN [Bid Materials] AS BM ON M.materialcode = BM.materialcode AND
M.mtype = BM.mtype) AS Material ON Material.projectnum = Project.projectnum LEFT JOIN

   (SELECT BL.bidhours, BL.laborunitcost, L.labordescription, BL.projectnum, (BL.bidhours
* BL.laborunitcost) AS [Extended Price]
    FROM [Bid Labor] AS BL JOIN labor As L ON BL.laborcode = L.laborcode) AS [Labor
Requrements] ON [Labor Requrements].projectnum = Project.projectnum


CREATE VIEW View_ProductionPlan

AS


SELECT [Project Bid Information].begdate, [Project Bid Information].compldate, [Project
Bid Information].bidammmount, [Project Bid Information].[Project Site], [Project Bid
Information].projname,
       [Project Team].[role], [Project Team].[Staff Name],
       [Material Requrements].deliver, [Material Requrements].[description], [Material
Requrements].[Ext.Cost Material], [Material Requrements].install, [Material
Requrements].[Net/Unit], [Material Requrements].qty, [Material Requrements].Size,
         Tools.deliverydate, Tools.ToolsQty, Tools.toolname,
         [Labor Requrements].[Cost/Hr], [Labor Requrements].[hours], [Labor
Requrements].labordescription, [Labor Requrements].task, [Labor Requrements].[time],
[Labor Requrements].[Ext. Cost Labor]

FROM (SELECT PP.begdate, PP.compldate, P.projname, D.bidammmount, CONCAT(p.streetname,
', ',p.streetnum,
', ',p.zip)AS [Project Site], PP.projectnum, PP.pplanid
FROM project AS P JOIN [Production Plan] AS PP ON P.projectnum = PP.projectnum JOIN
designbid AS D on D.projectnum = PP.projectnum) AS [Project Bid Information] LEFT JOIN

(SELECT PT.pplanid, PT.[role], CONCAT(S.fname,
', ',S.lname) AS [Staff Name]
 FROM productionteam AS PT JOIN staff AS S ON PT.emplid = S.emplid) AS [Project Team] ON
[Project Bid Information].pplanid = [Project Team].pplanid LEFT JOIN

 (SELECT PPM.pplanid, PPM.deliver, PPM.install, M.[description], PPM.[Net/Unit], PPM.qty,
CONCAT(M.size,
', ',M.sizeunits) AS [Size], (PPM.qty * PPM.[Net/Unit]) AS [Ext.Cost Material]
  FROM Material AS M JOIN productionplanmaterial AS PPM ON M.materialcode =
PPM.materialcode AND PPM.mtype = M.mtype) AS [Material Requrements] ON [Material
Requrements].pplanid = [Project Team].pplanid LEFT JOIN

 (SELECT PPT.pplanid, PPT.deliverydate, PPT.qty AS [ToolsQty], T.toolname
  FROM tools AS T JOIN prodplantools AS PPT ON T.toolid = PPT.toolid) AS Tools ON
Tools.pplanid = [Project Bid Information].pplanid LEFT JOIN

 (SELECT PPL.[Cost/Hr], PPL.[hours], PPL.task, PPL.[time], PPL.pplanid,
L.labordescription, (PPL.[hours] * PPL.[Cost/Hr]) AS [Ext. Cost Labor]
```

```
  FROM productionlabor AS PPL JOIN labor AS L ON L.laborcode = PPL.laborcode) AS [Labor
Requrements] ON [Labor Requrements].pplanid = [Project Bid Information].pplanid


CREATE VIEW View_BiddMatQty

AS

select sum(BM.bidqty) as [Bid Materials Qty], BM.materialcode
from [Bid Materials] BM
Group by BM.materialcode;

CREATE VIEW View_POMatttQty

AS

select sum(POM.quantity) as [PO Materials Qty], POM.materialcode, por.po_date
from [PO Materials] as POM join purchaseorder as por
on por.po_num = pom.po_num
group by POM.materialcode, por.po_date;

CREATE VIEW View_PPMattQty

AS

select sum(PPM.qty) as [PP Materials Qty], PPM.materialcode
from productionplanmaterial as PPM
group by PPM.materialcode;

CREATE VIEW View_InvoiceMattQty

AS

select sum(IM.qty) as [Invoice Materials Qty], IM.materialcode
from [Invoice Materials] as IM
group by IM.materialcode;

create view Inventoryreport
as
select (V2.[PO Materials Qty] - V4.[Invoice Materials Qty]) AS QOO,
(V4.[Invoice Materials Qty] - (V2.[PO Materials Qty] - V4.[Invoice Materials Qty])) as
QIS,
(V4.[Invoice Materials Qty] - (V2.[PO Materials Qty] - V4.[Invoice Materials Qty]) +
(V1.[Bid Materials Qty] - V3.[PP Materials Qty]))as ISOB,
(V2.[PO Materials Qty] - V4.[Invoice Materials Qty] + (V1.[Bid Materials Qty] - V3.[PP
Materials Qty])) as OOOB,
MAX(V2.po_date) as LastOrdered
from View_BiddMatQty as V1 join View_POMatttQty as V2
     on V1.materialcode = V2.materialcode
join View_PPMattQty as V3
on V2.materialcode = V3.materialcode
join View_InvoiceMattQty as V4
on V3.materialcode = V4.materialcode
```

4. Stored Procedures

```
CREATE PROCEDURE [Specific Design Bid]
      @projectnum CHAR(2),
      @bidVersion CHAR(8)
AS

SELECT *
FROM View_DesignBid as V1
```

```
WHERE V1.bidvesion = @bidVesion
      V1.projectnum = @projectnum



CREATE PROCEDURE [Specific Production Plan]
       @pplanid CHAR(8)
AS

SELECT *
FROM View_ProductionPlan as V2
WHERE V2.P.pplanid = @pplanid
```

5. Transactions

```
BEGIN TRANSACTION;

BEGIN TRY
INSERT INTO clientzip([zip], [city], [state])
  VALUES
  ('95066', 'Fairfax', 'CA');
INSERT INTO Client([accountnum], [name], [streetnum], [streetname], [zip])
  VALUES
  ('04738263', 'London Sq Mall', '12638', 'Mall Drive Scotts Valley', '95066');
INSERT INTO contact([contactid], [fname], [lname], [telnum], [accountnum])
  VALUES
  ('6348264738594721', 'AMY', 'BENSON', '4087753652', '04738263');
INSERT INTO [project]([projectnum], [projname], [streetnum],[streetname], [zip], [city],
[state], [accountnum], [contactid], [zipclient])
  VALUES
  ('46738457', 'LS Mall', '4450', 'Mall Dr.', '22030', 'Sacramento', 'CA', '04738263',
'6348264738594721', '95066')

INSERT INTO staff ([emplid], [lname], [fname], [tel])
  VALUES
  ('0000', ' Reinhardt ', ' Bill ', '4088346032'),
  ('0001', 'Bakken', 'Tamara', '4088346056');
 INSERT INTO material([materialcode], [mtype], [description], [size], [sizeunits])
  VALUES
  ('46372819', 'plants', 'laccospadix australaica palm', '15', 'gal'),
  ('21672563', 'plants', 'carryota mitis', '7', 'gal'),
  ('82637283', 'plants', 'marginata', '2', 'gal'),
  ('36728362', 'pottery', 'granite fontain', '48', 'in'),
  ('37612893', 'pottery', 'granite pots', '50', 'gal'),
  ('37892173', 'materials', 'decorative sedar bark', '5', 'cu ft'),
  ('78236217', 'materials', 'top soil', '1', 'yard');

INSERT INTO labor([laborcode], [labordescription], [chargerate])
  VALUES
  ('783294', 'production workers', '2'),
  ('283732', 'design consultant', '3'),
  ('826373', 'heavy equipment operator', '4');

INSERT INTO [designbid]([projectnum],[bidversion], [biddate], [estbegindate],
[estcompletiondate], [bidammmount])
  VALUES
  ('46738457', '1', '1996-05-06', '1996-06-15', '1996-06-30', '7561')
```

```
INSERT INTO [Bid Labor]([laborcode], [projectnum], [bidversion],[bidhours],
[laborunitcost])
  VALUES
  ('783294', '46738457', '1', '30', '30'),
  ('283732', '46738457', '1', '10', '65'),
  ('826373', '46738457', '1', '10', '65');

INSERT INTO [Bid Materials]([projectnum], [bidversion], [materialcode],[mtype], [bidqty],
[bidunitprice])
  VALUES
  ('46738457', '1', '46372819', 'plants', '3', '749'),
  ('46738457', '1', '21672563', 'plants', '5', '233'),
  ('46738457', '1', '82637283', 'plants','7', '75'),
   ('46738457', '1', '36728362', 'pottery', '1', '750'),
    ('46738457', '1', '37612893', 'pottery', '3', '195'),
        ('46738457', '1', '37892173', 'materials', '10','15.95'),
         ('46738457', '1', '78236217', 'materials', '1', '20');
INSERT INTO [Bid Staff] ([emplid], [bidversion], [projectnum], [role])
  VALUES
  ('0000', '1', '46738457', 'Sales Asoc'),
  ('0001', '1', '46738457', 'Designer');


    COMMIT TRANSACTION;
  PRINT 'TRANSACTION COMPLETED';
END TRY

BEGIN CATCH
  ROLLBACK TRANSACTION;
  PRINT 'ERROR WITH RECORDS TO BE ENTERED'
END CATCH

BEGIN TRANSACTION;

BEGIN TRY
INSERT INTO [Production Plan]([pplanid], [bidversion], [projectnum], [begdate],
[compldate])
  VALUES
  ('12345678', '1', '46738457', '06-14-1995', '06-18-1995');

  INSERT INTO [pdwr]([pplanid], [pdwrversion], [Date], [submission], [projectnum])
  VALUES
  ('12345678', '19203726', '06-17-1996', '0000', '46738457');


INSERT INTO [pdwrlabor]([pdwrversion], [laborcode], [hours], [Cost/Hr], [task], [worker])
  VALUES
  ('19203726', '283732', '8', '18', 'installed plants', '0000'),
  ('19203726', '783294', '8', '18', 'installed plants', '0001');


INSERT INTO [pdwrmaterials]([materialcode], [mtype], [unitcost], [qty], [pdwrversion],
[approval])
  VALUES
  ('19203726', '283732', '8', '18', 'installed plants', '0000');

INSERT INTO [pdwrmaterials]([materialcode], [mtype], [unitcost], [qty], [pdwrversion],
[approval])
  VALUES
  ('46372819', 'plants', '143', '5', '19203726', '0000'),
  ('21672563', 'plants', '45', '7', '19203726', '0000'),
  ('82637283', 'plants', '7.5', '10', '19203726', '0000')

COMMIT TRANSACTION;
```

```
  PRINT 'TRANSACTION COMPLETED';
END TRY

BEGIN CATCH
  ROLLBACK TRANSACTION;
  PRINT 'ERROR WITH RECORDS TO BE ENTERED'
END CATCH
```

6. Triggers

1)
```
CREATE TRIGGER newProjectShow
ON project
AFTER INSERT
       AS
       SELECT *
       FROM INSERTED
```

2)
```
CREATE TRIGGER statusChange
ON [Production Plan]
AFTER UPDATE
       AS
       IF Exists(*)
              SELECT*
              FROM deleted d join [Production Plan] p
              on p.bidversion = d.bidversion

       Begin
       Rollback;
```

3)
```
CREATE TRIGGER [Hours]
ON [pdwr]
AFTER UPDATE
       AS
       IF exists
              (SELECT pd.worker, sum(pd.[hours])
              FROM inserted s join pdwr p
              on s.projectnum = p.projectnum
              join project pr
              on pr.projectnum = p.projectnum
              join pdwrlabor pd
              on pd.pdwrversion = p.pdwrversion
              groupby p.projectnum, pd.worker)
              begin
              rollback;
```