THE STUDY ON MAPPING POLICY AND TOPOGRAPHIC MAPPING FOR THE INTEGRATED NATIONAL DEVELOPMENT PLAN OF THE PHILIPPINES

EDITION 1

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1. Introduction

BINGO is a modern and efficient program system for combined photogrammetric geodetic point determination. It can be used for aerial triangulation with large blocks as well as for the terrestrial photogrammetry and the three-dimensional adjustment of geodetic networks.

The initial aim of BINGO development in the years about 1980 was to process photogrammetric geodetic networks for engineering applications of photogrammetry. For this reason a special emphasis was put on a rigorous mathematical model, flexible application possibilities of the functions and a differentiated stochastic model. These principles have been followed during the development of standard aerial triangulation and consideration of the kinematic GPS-positioning. Despite of the wide range of possibilities the program is still easy to handle, as the enclosed example data show.

The standard method for photo orientation in photogrammetry is the bundle block adjustment. The photo coordinates of the object points will be measured with high precision by analytical plotters or digital photogrammetric workstations manually or automatically. In bundle block adjustments the rays from the object points through the projection centers to the measured photo points represent a spatial pencil of rays for each photo. By means of the bundle adjustment all homologous rays of one point will be optimized to intersect in one point.

If additional parameters and a simultaneous camera calibration are included in the bundle adjustment, the systematic errors in the photographs and in the photogrammetric systems can be reduced considerably and improve the precision of the result.

The purpose of adjustment is the determination of the three-dimensional object coordinates of the measured points and the determination of the orientation parameters of the photographs. These orientation parameters are directly available for further use after bundle block adjustment. The adjusted coordinates of object points will be necessary in most cases for further processing of all kinds.

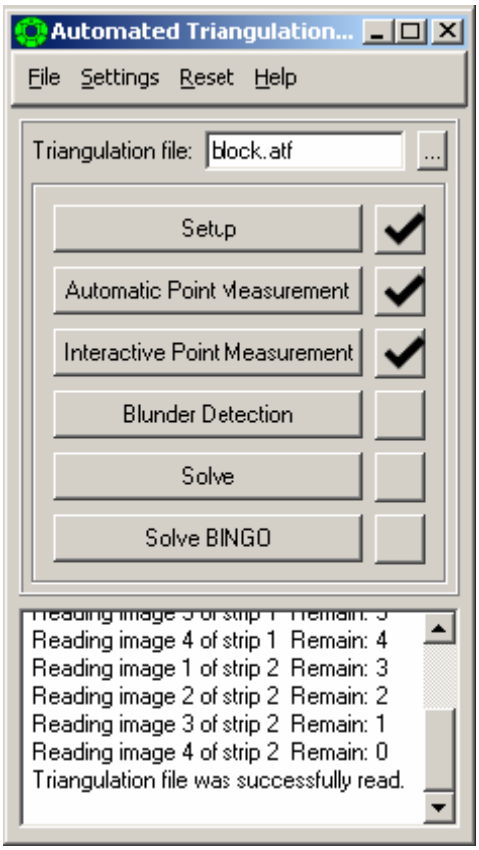
The method of bundle block adjustment can be applied for aerial photos as well as for terrestrial applications. Various survey measurements and photogrammetric observations in addition to the commonly used control points can be included in the adjustment, to strengthen the block.

Normally, the search for data errors plays an important role in adjustment computation. BINGO uses the data-snooping method according to Baarda in an extended version. In the first step detected errors will only be indicated. A further process allows the automatic elimination of the detected errors in photo measurements. Concerning all other types of observations like control points, GPS-data etc., the operator must correct or remove faulty observations himself.

Before adjustment, all initial orientation data and point coordinates have to be estimated. This process includes special error detection methods: the balanced L2-norm adjustment and the RANSAC-method (Random Sample Consensus). This ensures that even in case of several gross errors the initial approximations will not be falsified.

2. Ground Control Only (no Airborne GPS)

a) Start BINGO by selecting the "Solve BINGO" button in the main MST window.



Answer "No" to "Overwrite backup files from current directory?".

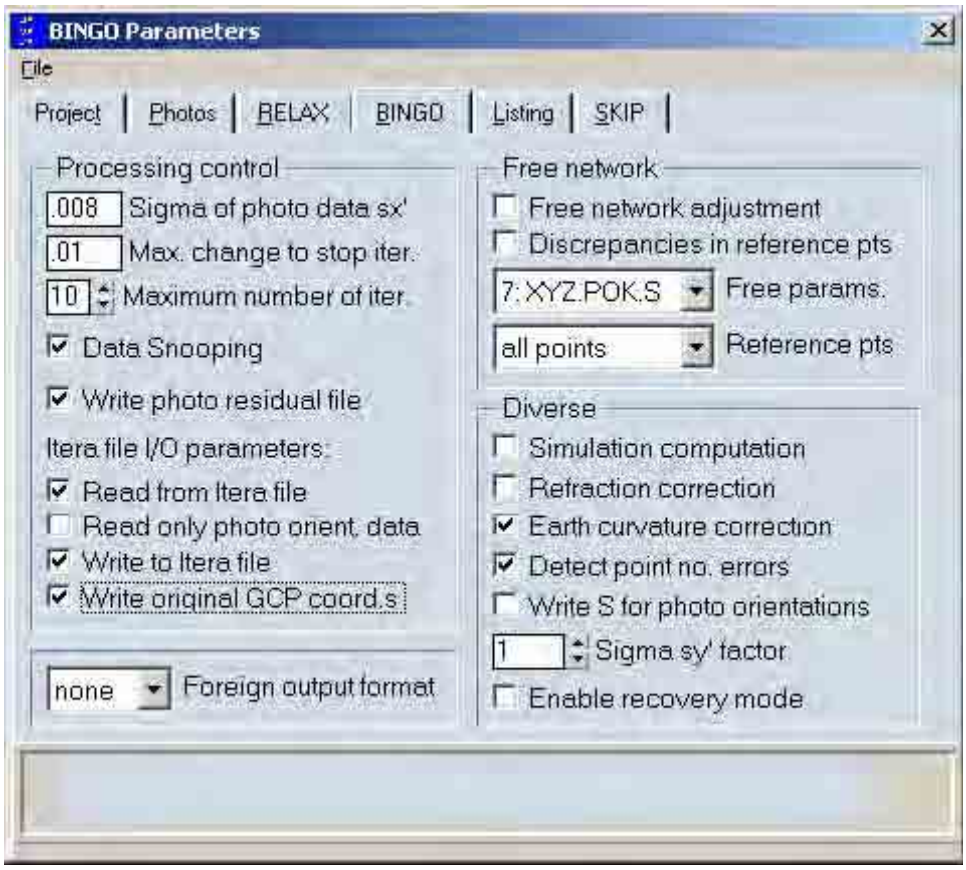
This will start the BINGO Manager and will automatically create the following BINGO files in the SOCET SET project's .\bingo directory:

project.dat

geoin.dat SOCET SET will populate the geoin.dat file automatically with the camera file (CAPA and RADI) and control points (CONT).

image.dat SOCET SET will populate the image.dat file automatically with the measured image coordinates from the SOCET IPF files.

b) In the BINGO Manager, select the BINGO Parameters tool. Review the current parameters and make any necessary modifications. Under the BINGO tab, set the following:



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c) In the BINGO Manager select "Edit GEO Input File," comment out the ground control points and save the changes:

```
C   Control points  [with standard deviations]
C   <___Point_Name_><______X_____><______Y_____><_____Z___><_S_X_><_S_Y_><_S_Z_>
*CONT
*CONT               A    690058.740    191136.825    534.945  0.300  0.300  0.200
*CONT               B    690594.773    191528.651    444.984  0.300  0.300  0.200
*CONT               C    690779.554    190960.170    477.873  0.300  0.300  0.200
*CONT               D    690834.112    190928.776    470.687  0.300  0.300  0.200
*CONT               E    690696.961    190386.256    525.715  0.300  0.300  0.200
*CONT               F    691187.185    190613.228    452.887  0.300  0.300  0.200
*CONT               G    691046.143    191666.565    479.557  0.300  0.300  0.200
*CONT               H    691190.918    191129.368    451.078  0.300  0.300  0.200
*CONT               I    691265.177    190947.114    456.734  0.300  0.300  0.200
```

d) Run RELAX.

e) Run BINGO (with a Free Network Adjustment). A SKIP file should be created, so apply the detected errors to the image coordinates by pressing the "Sk" button and run BINGO again. If the iterative solution shows a pattern of convergence, press the "Cy" button to automatically cycle through BINGO and SKIP. Continue until the solution converges and ends normally, which will most likely result with a Sigma 0 between 12 and 16.

f) In the BINGO Manager select the BINGO Parameter tool; disable "Free Network Adjustment" under the "BINGO" tab, and save the changes.

g) In the BINGO Manager select "Edit GEO Input File," remove the comment characters for the ground control points, and save the changes:

```
C   Control points  [with standard deviations]
C   <___Point_Name_><______X_____><______Y_____><_____Z___><_S_X_><_S_Y_><_S_Z_>
*CONT
CONT                A     690058.740    191136.825    534.945  0.300  0.300  0.200
CONT                B     690594.773    191528.651    444.984  0.300  0.300  0.200
CONT                C     690779.554    190960.170    477.873  0.300  0.300  0.200
CONT                D     690834.112    190928.776    470.687  0.300  0.300  0.200
CONT                E     690696.961    190386.256    525.715  0.300  0.300  0.200
CONT                F     691187.185    190613.228    452.887  0.300  0.300  0.200
CONT                G     691046.143    191666.565    479.557  0.300  0.300  0.200
CONT                H     691190.918    191129.368    451.078  0.300  0.300  0.200
CONT                I     691265.177    190947.114    456.734  0.300  0.300  0.200
```

h) Remove the "itera.dat" file to prevent the previously computed "relative" orientation values from being used as initial values.

i) Run RELAX.

j) Run BINGO. If a SKIP file is created, apply the detected errors to the image coordinates by pressing the "Sk" button and run BINGO again. If the iterative solution shows a pattern of convergence, press the "Cy" button to automatically cycle through BINGO and SKIP. Continue until the solution converges and ends normally, which most likely will produce a Sigma 0 value between 10 and 15.

Note: If, after adding the ground control points and running an absolute solution with a minimum number of ground controls points, BINGO reports a Sigma 0 hat is significantly higher than with the Free Network Adjustment, it is recommended that the SKIP file NOT be applied. An unusually high or unexpected Sigma 0 value at this point is indicative of a problem not necessarily related to the image measurements. For example, the XYZ coordinates of one of the control points might be incorrect; a control point might be misidentified; or the control point standard deviations might be too small. Any of these can cause a high Sigma 0 by putting pressure on the photogrammetric solution.

k) Review the results graphically with the REPLO and 3DViewM programs.

l) Review the "bingo.lis", "reselli.dat", and "imresi.dat" files for additional adjustment results (residuals, standard deviations, statistical frequency, variance components, …).

In particular, the test values that are computed from the a posteriori variance-component estimation are listed toward the bottom of the "bingo.lis" file. The greater the redundancy in each group, the more closely should the test value
approach 1.0. A range of 0.95 to 1.05 is considered as a close approximation.

If the test value deviates from 1.0 there may either be gross observation errors within the group, or the standard deviation has not been correctly estimated, and must therefore be corrected. All observations of the corresponding group should be considered in such a change.

m) Exit BINGO and update the SOCET SET GPF, IPF and SUP files.

n) In the SOCET SET MST window, press the "Interactive Point Measurement" button, select and measure the remaining unmeasured ground control points in all images.

o) Exit IPM, reload "Solve BINGO" and run BINGO (RELAX, BINGO, SKIP, and CYCLE) to include the remaining ground control points.

p) After a successful adjustment, exit BINGO and update the SOCET SET GPF, IPF and SUP files.

q) Since the BINGO Data Snooping option will automatically remove blunder rays from the measured image points, it's recommended that the SOCET SET APM module be run a second time with a "zero.tpp" file. When APM uses this pattern file, no new points will be added, but it will attempt to measure all missing rays.

r) After running APM, go back into BINGO, finish the adjustment, exit BINGO, and update the SOCET SET GPF, IPF and SUP files.

3. Airborne GPS without Ground Control

Using AGPS Data

To introduce AGPS data into BINGO, the geoin.dat file must be updated so the AGPS section is included. If the data is reduced to photo center, the **GPSP** statement should be used; otherwise the **GPSA** statement should be used. Both statements direct BINGO to use an additional file containing the AGPS data. The **ECES** statement is used to define the standard deviation of the offset vector from the antenna to the photo center. Lastly, the **ECCA** statement defines the offset vector, if known.

In this example, a file called **dgps.dat** is copied to the .\Bingo subdirectory. The data for each photo must be in the format of:

PhotoID Time (in seconds) X Y Z precision

Also, each flight line or strip must be prefaced by the statement LINE followed by the line number (unique to each line but not necessarily relating to the Strip ID) and the drift and shift parameters, if desired. For example:

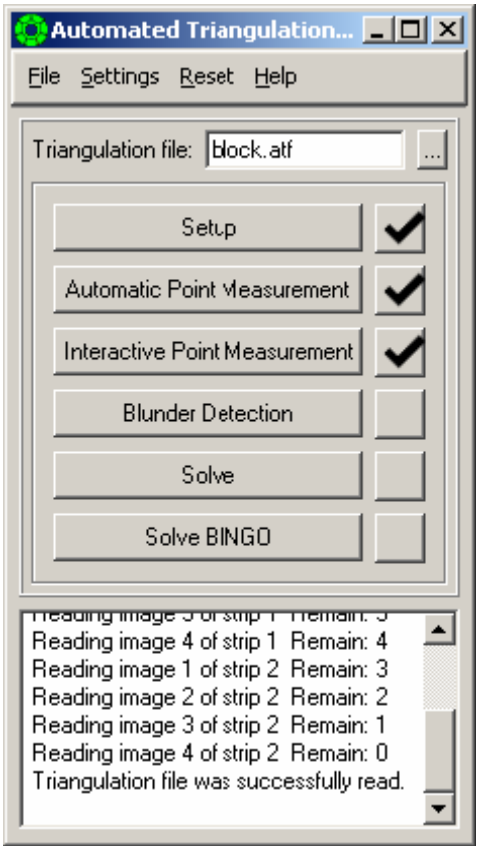
```
LINE 8 000000
 8_3818  1001.0   690831.08592  190366.18329  1208.33074    0.300
 8_3817  1002.0   690627.95586  190715.56034  1206.97167    0.300
 8_3816  1003.0   690427.19857  191065.66007  1211.33235    0.300
 8_3815  1004.0   690226.49394  191426.86303  1212.73767    0.300
LINE 10 000000
10_3881  1011.0   691556.35216  190665.60143  1219.46747    0.300
10_3880  1012.0   691341.68479  191071.05346  1215.09243    0.300
10_3879  1013.0   691130.89062  191471.01395  1213.26803    0.300
10_3878  1014.0   690933.34525  191835.85310  1208.32511    0.300
```

Individual photos can be removed easily by marking them with the #.

Using “000000” will disable the computation of the drift and shift parameters. Using “111111” values will introduce drift and shift parameters into the adjustment. These are included whenever the antenna offsets are not known, or if the AGPS data is not good in an absolute sense.

The individual photos in a given line must be ordered in ascending order according to the time field. The time field should be provided but does not have to be strictly correct and for projects with the flights being all in the same direction (NS or EW), the time can be a simple integer value as (1, 2, 3…). If the time isn’t know, arbitrary seconds can be used with ascending or descending values to coincide with the order of the photos.

a) Start BINGO by selecting the “Solve BINGO” button in the main MST window.



Answer “No” to “Overwrite backup files from current directory?”.

This will start the BINGO Manager and will automatically create the following BINGO files in the SOCET project’s .\bingo directory:

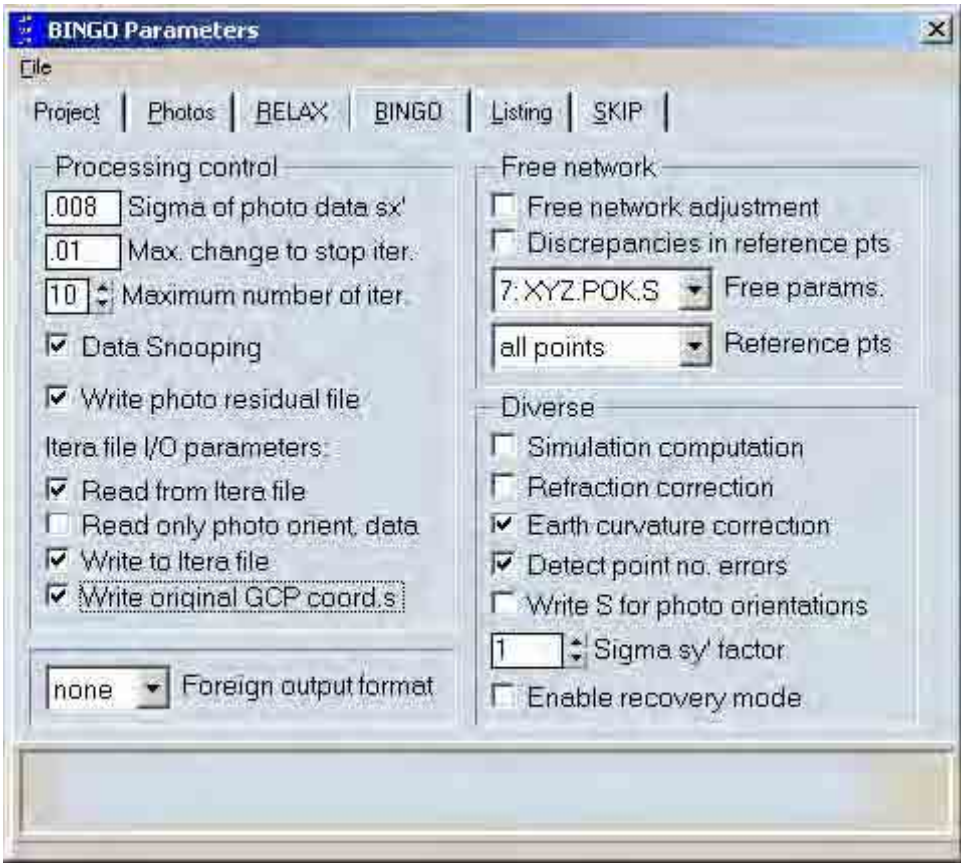
project.dat

geoin.dat — SOCET SET will populate the geoin.dat file automatically with the camera file (CAPA and RADI).

image.dat — SOCET SET will populate the image.dat file automatically with the measured image coordinates from the SOCET IPF files.

b) Copy the “dgps.dat” file into the .\bingo directory.

c) In the BINGO Manager, select the BINGO Parameters tool. Review the current parameters and make any necessary modifications. Under the BINGO tab, set the following:



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d) In the BINGO Manager select “Edit GEO Input File”, and add the name of the GPS file that contains the projection center (or camera) coordinates. Since a “Free network adjustment” will be initially run, leave the comment character at the beginning of the line. Save the changes:

```
C   GPS projection center coordinates (GPSP)
C      (_key_)   (_File_name___max_64_char_)    [(_FACTOR_S_GPS_)]
*FILE  GPSP  dgps.dat
```

e) Run RELAX and apply any corrections of gross errors with the “Sk” button.

f) Run BINGO (with a Free Network Adjustment). A SKIP file should be created, so apply the detected errors to the image coordinates by pressing the “Sk” button and run BINGO again. If the iterative solution shows a pattern of convergence, press the “Cy” button to automatically cycle through BINGO and SKIP. Continue until the solution converges and ends normally, which will most likely result in a Sigma 0 between 12 and 16.

g) In the BINGO Manager select the BINGO Parameter tool; disable “Free Network Adjustment” under the “BINGO” tab, and save the changes.

h) In the BINGO Manager select “Edit GEO Input File”, remove the comment character in front of the GPS file, and save the changes:

```
C   GPS projection center coordinates (GPSP)
C      (_key_)   (_File_name___max_64_char_)    [(_FACTOR_S_GPS_)]
FILE  GPSP  dgps.dat
```

i) Remove or edit the “itera.dat” file to prevent the previously computed “relative” orientation values in the local coordinate system from being used as initial values.

If an AT job is to be processed with BINGO, and Airborne GPS is the only control available for the adjustment, the RELAX program will not use the APGS in its initial approximations. Thus the orientation data generated by RELAX will be in a local coordinate system. And if BINGO were to be started after RELAX (with the local coordinate system), unpredictable results might occur, such as a divergent solution or upside-down orientations.

This potential problem can be addressed with the following:

Having run RELAX in the normal way with a free network adjustment to eliminate any gross errors that might be present in the photo measurements, but before starting BINGO, the “itera.dat” file needs to be updated with the approximate camera positions that were used during the SOCET BINGO Frame Import. For example:

```
*
*                                BINGO Output File
*

*   <___Photo_No.__><___Easting__><__Northing__><__Height_><___Phi__><__Omega_><__Kappa_><___Camera_No._>

ORIA          8_3815       690229       191423       1220   0.0       0.0     135.0          rc20_13133
ORIA          8_3816       690423       191063       1220   0.0       0.0     135.0          rc20_13133
ORIA          8_3817       690628       190719       1220   0.0       0.0     135.0          rc20_13133
ORIA          8_3818       690837       190368       1220   0.0       0.0     135.0          rc20_13133
ORIA         10_3878       690931       191834       1220   0.0       0.0     135.0          rc20_13133
ORIA         10_3879       691127       191476       1220   0.0       0.0     135.0          rc20_13133
ORIA         10_3880       691344       191074       1220   0.0       0.0     135.0          rc20_13133
ORIA         10_3881       691555       190661       1220   0.0       0.0     135.0          rc20_13133

END
```

The “itera.dat” file can be manually edited to include the initial values.

*Or, the BAE Systems “**make_itera.exe**” utility program can be used to read the SOCET SET support files and extract the Photo_Number, X, Y, Z, Phi, Omega, Kappa, and Camera_Number parameters. The “make_itera.exe ”program will create a new file called “itera.dat”. Since the “**make_itera.exe**” program is run from a command prompt window in the SOCET SET project directory, the resulting “itera.dat” can be copied to the .\bingo subdirectory to replace the BINGO-generated “itera.dat” file.*
Using the updated initial orientation values, BINGO can accurately process the data.

j) Run BINGO. If a SKIP file is created, apply the detected errors to the image coordinates by pressing the "Sk" button and run BINGO again. If the iterative solution shows a pattern of convergence, press the "Cy" button to automatically cycle through BINGO and SKIP. Continue until the solution converges and ends normally, which will most likely result in a Sigma 0 between 10 and 15.

   Note: If, after adding the airborne GPS points and running an absolute solution, BINGO reports a Sigma 0 that is significantly higher than with the Free Network Adjustment, it is recommended that the SKIP file **NOT** be applied. An unusually high or unexpected Sigma 0 value at this point is indicative of a problem not necessarily related to the image measurements. For example, the XYZ coordinates of one of the AGPS points might be incorrect; an AGPS point might be have misidentified; or the AGPS point standard deviations might be too small. Any of these can cause a high Sigma 0 by putting "pressure" on the photogrammetric solution.

k) Review the results graphically with the REPLO and 3DViewM programs.

l) Review the "bingo.lis", "reselli.dat", and "imresi.dat" files for additional adjustment results (residuals, standard deviations, statistical frequency, variance components, …).

   In particular, the test values that are computed from the a posteriori variance-component estimation are listed toward the bottom of the "bingo.lis" file. The greater the redundancy in each group, the more closely should the test value
   approach 1.0. A range of 0.95 to 1.05 is considered as a close approximation.

   If the test value deviates from 1.0 there may either be gross observation errors within the group, or the standard deviation has not been correctly estimated, and must therefore be corrected. All observations of the corresponding group should be considered in such a change.

m) Exit BINGO and update the SOCET SET GPF, IPF and SUP files.

n) In the SOCET SET MST window, press the "Interactive Point Measurement" button, select and measure the remaining unmeasured ground control points in all images.

o) Exit IPM, reload "Solve BINGO" and run BINGO (RELAX, BINGO, SKIP, and CYCLE) to include the remaining ground control points.

p) After a successful adjustment, exit BINGO and update the SOCET SET GPF, IPF and SUP files.

q) Since the BINGO Data Snooping option will automatically remove blunder rays from the measured image points, it's recommended that the SOCET SET APM module be run a second time with a "zero.tpp" file. When APM uses this pattern file, no new points will be added, but it will attempt to measure all missing rays.

r) After running APM, go back into BINGO, finish the adjustment, exit BINGO, and update the SOCET SET GPF, IPF and SUP files.

4. Ground Control with Airborne GPS

Using AGPS Data

To introduce AGPS data into BINGO, the geoin.dat file must be updated so the AGPS section is included. If the data is reduced to photo center, the **GPSP** statement should be used; otherwise the **GPSA** statement should be used. Both statements direct BINGO to use an additional file containing the AGPS data. The **ECES** statement is used to define the standard deviation of the offset vector from the antenna to the photo center. Lastly, the **ECCA** statement defines the offset vector, if known.

In this example a file called **dgps.dat** is copied to the .\Bingo subdirectory. The data for each photo must be in the format of:

PhotoID Time (in seconds) X Y Z precision

Also, each flight line or strip must be prefaced by the statement LINE followed by the line number (unique to each line but not necessarily relating to the Strip ID) and the drift and shift parameters, if desired. For example:

```
LINE 8 000000
 8_3818  1001.0   690831.08592  190366.18329  1208.33074    0.300
 8_3817  1002.0   690627.95586  190715.56034  1206.97167    0.300
 8_3816  1003.0   690427.19857  191065.66007  1211.33235    0.300
 8_3815  1004.0   690226.49394  191426.86303  1212.73767    0.300
LINE 10 000000
10_3881  1011.0   691556.35216  190665.60143  1219.46747    0.300
10_3880  1012.0   691341.68479  191071.05346  1215.09243    0.300
10_3879  1013.0   691130.89062  191471.01395  1213.26803    0.300
10_3878  1014.0   690933.34525  191835.85310  1208.32511    0.300
```

Individual photos can be removed easily by marking them with #.

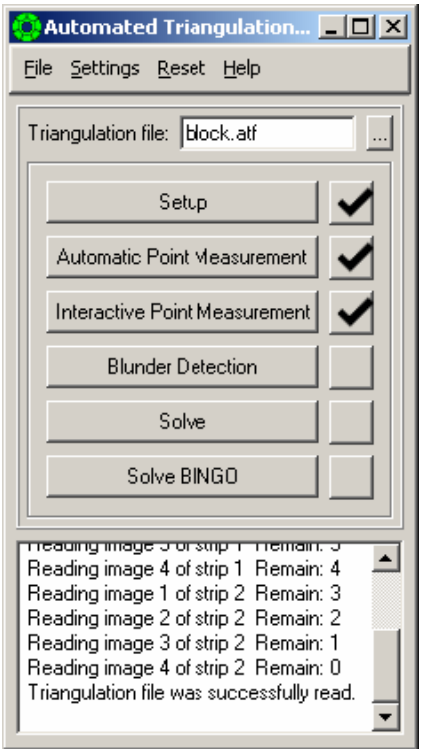
Using “000000” will disable the computation of the drift and shift parameters. Using “111111” values will introduce drift and shift parameters into the adjustment. These are included whenever the antenna offsets are not known, or if the AGPS data is not good in an absolute sense.

The individual photos in a given line must be ordered in ascending order according to the time field. The time field should be provided but does not have to be strictly correct. For projects with the flights being all in the same direction (NS or EW), the time can be a simple integer value as (1, 2, 3…). If the time isn’t know, arbitrary seconds can be used with ascending or descending values to agree with the order of the photos.

The recommended procedure when processing an AT job with ground control and AGPS is the following:

- Free Network Adjustment
- Add Ground Control and Solve
- Add AGPS Data and Solve

a) Start BINGO by selecting the “Solve BINGO” button in the main MST window.



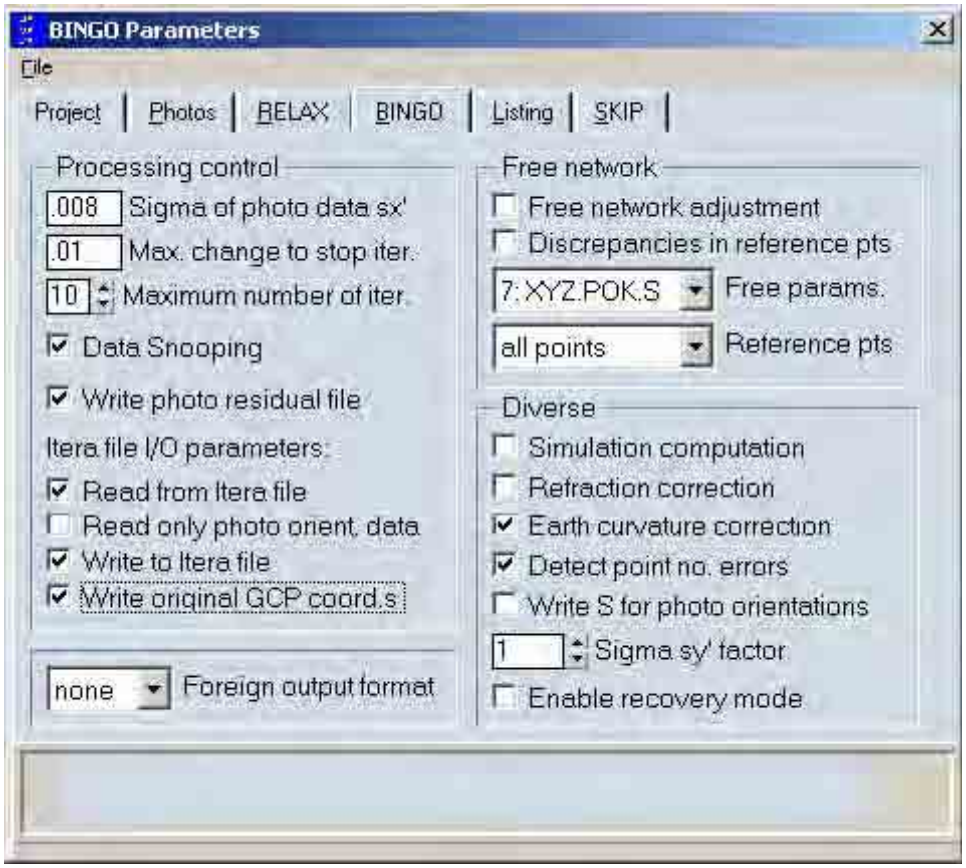
Answer “No” to “Overwrite backup files from current directory?”.

This will start the BINGO Manager and will automatically create the following BINGO files in the SOCET project’s .\bingo directory:

project.dat	
geoin.dat	SOCET SET will populate the geoin.dat file automatically with the camera file (CAPA and RADI) and control points (CONT).
image.dat	SOCET SET will populate the image.dat file automatically with the measured image coordinates from the SOCET IPF files.

b) Copy the “dgps.dat” file into the .\bingo directory.

c) In the BINGO Manager, select the BINGO Parameters tool. Review the current parameters and make any necessary modifications. Under the BINGO tab, set the following:



File | Save

d) In the BINGO Manager select “Edit GEO Input File”, comment out the ground control points, and save the changes:

```
C   Control points  [with standard deviations]
C   <___Point_Name_><______X_____><______Y_____><_____Z___><_S_X_><_S_Y_><_S_Z_>
*CONT
*CONT               A    690058.740    191136.825    534.945  0.300  0.300  0.200
*CONT               B    690594.773    191528.651    444.984  0.300  0.300  0.200
*CONT               C    690779.554    190960.170    477.873  0.300  0.300  0.200
*CONT               D    690834.112    190928.776    470.687  0.300  0.300  0.200
*CONT               E    690696.961    190386.256    525.715  0.300  0.300  0.200
*CONT               F    691187.185    190613.228    452.887  0.300  0.300  0.200
*CONT               G    691046.143    191666.565    479.557  0.300  0.300  0.200
*CONT               H    691190.918    191129.368    451.078  0.300  0.300  0.200
*CONT               I    691265.177    190947.114    456.734  0.300  0.300  0.200
```

e) Run RELAX.

f) Run BINGO (with a Free Network Adjustment). A SKIP file should be created, so apply the detected errors to the image coordinates by pressing the "Sk" button and run BINGO again. If the iterative solution shows a pattern of convergence, press the "Cy" button to automatically cycle through BINGO and SKIP. Continue until the solution converges and ends normally, which most likely will produce a Sigma 0 value between 12 and 16.

g) In the BINGO Manager select the BINGO Parameter tool; disable "Free `Network Adjustment" under the "BINGO" tab and save the changes.

h) In the BINGO Manager select "Edit GEO Input File", remove the comment characters for the ground control points, and save the changes:

```
C   Control points  [with standard deviations]
C   <___Point_Name_><______X_____><______Y_____><_____Z___><_S_X_><_S_Y_><_S_Z_>
*CONT
CONT                A    690058.740    191136.825    534.945  0.300  0.300  0.200
CONT                B    690594.773    191528.651    444.984  0.300  0.300  0.200
CONT                C    690779.554    190960.170    477.873  0.300  0.300  0.200
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i) Remove the "itera.dat" file to prevent the previously computed "relative" orientation values from being used as initial values.

j) Run RELAX.

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Note: If, after adding the ground control points and running an absolute solution with a minimum number of ground controls points, BINGO reports a Sigma 0 that is significantly higher than with the Free Network Adjustment, it is recommended that the SKIP file **NOT** be applied. An unusually high or unexpected Sigma 0 value at this point is indicative of a problem not necessarily related to the image measurements. For example, the XYZ coordinates of one of the control points might be incorrect; a control point might have been misidentified; or the control point standard deviations might be too small. Any of these can cause a high Sigma 0 by putting pressure on the photogrammetric solution.

l) Review the results graphically with the REPLO and 3DViewM programs.

m) Review the "bingo.lis", "reselli.dat", and "imresi.dat" files for additional adjustment results (residuals, standard deviations, statistical frequency, variance components, …).

In particular, the test values that are computed from the a posteriori variance-component estimation are listed toward the bottom of the "bingo.lis" file. The greater the redundancy

in each group, the more closely should the test value approach 1.0. A range of 0.95 to 1.05 is considered as a close approximation.

If the test value deviates from 1.0 there may either be gross observation errors within the group, or the standard deviation has not been correctly estimated, and must therefore be corrected. All observations of the corresponding group should be considered in such a change.

n) Exit BINGO and update the SOCET SET GPF, IPF and SUP files.

o) In the SOCET SET MST window, press the "Interactive Point Measurement" button, then select and measure the remaining unmeasured ground control points in all images.

p) Exit IPM, reload "Solve BINGO" and run BINGO (RELAX, BINGO, SKIP, and CYCLE) to include the remaining ground control points.

q) After a successful adjustment, exit BINGO and update the SOCET SET GPF, IPF and SUP files.

r) Since the BINGO Data Snooping option will automatically remove blunder rays from the measured image points, it's recommended that the SOCET SET APM module be run a second time with a "zero.tpp" file. When APM uses this pattern file, no new points will be added, but it will attempt to measure all missing rays.

s) After running APM, go back into BINGO and finish the adjustment.

t) In the BINGO Manager select "Edit GEO Input File", add the name of the GPS file that contains the projection center (or camera) coordinates. Save the changes:

```
C   GPS projection center coordinates (GPSP)
C      (_key_)   (_File_name___max_64_char_)    [(_FACTOR_S_GPS_)]
FILE  GPSP  dgps.dat
```

u) Run RELAX and look for any gross errors that might have appeared with the addition of the AGPS file. If gross errors occur, don't apply any corrections of gross errors with the "Sk" button before reviewing the exact nature of the problem.

v) If gross errors don't exist, run BINGO. If a SKIP file is created, apply the detected errors to the image coordinates by pressing the "Sk" button and run BINGO again. If the iterative solution shows a pattern of convergence, press the "Cy" button to automatically cycle through BINGO and SKIP. Continue until the solution converges and ends normally, which most likely will produce a Sigma 0 value between 12 and 16.

Note: If, after adding the airborne GPS points and running an absolute solution, BINGO reports a Sigma 0 that is significantly higher than with the ground-only adjustment, it is recommended that the SKIP file **NOT** be applied. An unusually high or unexpected Sigma 0 value at this point is indicative of a problem not necessarily related to the image measurements. For example, the XYZ coordinates of one of the AGPS points might be incorrect; an AGPS point might have been misidentified; or the AGPS point standard deviations might be too small. Any of these can cause a high Sigma 0 by putting pressure on the photogrammetric solution.

w) Review the results graphically with the REPLO and 3DViewM programs.

x) Review the “bingo.lis”, “reselli.dat”, and “imresi.dat” files for additional adjustment results (residuals, standard deviations, statistical frequency, variance components, …).

In particular, the test values that are computed from the a posteriori variance-component estimation are listed toward the bottom of the “bingo.lis” file. The greater the redundancy in each group, the more closely should the test value approach 1.0. A range of 0.95 to 1.05 is considered as a close approximation. If the test value deviates from 1.0 there may either be gross observation errors within the group, or the standard deviation has not been correctly estimated, and must therefore be corrected. All observations of the corresponding group should be considered in such a change.

y) Exit BINGO and update the SOCET SET GPF, IPF and SUP files.

5. General Input Information

SOCET Project
Flying Height: 1210 m Average Ground Elevation: 500 m
GSD: .12 m Photo Scale 1:4700
25 micron scan
Nominal Image Size: 220 mm
Data strip: right side
Approximate kappa angles: 120 degrees
Control Point Accuracy (XYZ): .3 .3 .2
AGPS Accuracy: .3

Camera Calibration File (rc20_13133.cam)
Focal Length (mm) 152.730000
Principal Point Offset (PPA – in mm) x = 0.000 y = 0.000
Fiducial x, y pairs in mm
1 106.002 -106.003
2 - 106.000 -106.001
3 - 106.000 106.002
4 106.000 106.002

Distance Distortion Data Pairs (distance in mm, distortion in microns)

10.00	0.60	80.00	-0.20
20.00	0.80	90.00	-0.10
30.00	0.80	100.00	0.00
40.00	0.70	110.00	0.10
50.00	0.20	120.00	-0.02
60.00	0.00	130.00	-0.04
70.00	-0.10	140.00	-0.03

Initial Camera Positions (Approximate X Y Z Omega Phi Kappa – meters, degrees**)**

8_3815	690229	191423	1220	0.0	0.0	120.0
8_3816	690421	191063	1220	0.0	0.0	120.0
8_3817	690631	190719	1220	0.0	0.0	120.0
8_3818	690837	190368	1220	0.0	0.0	120.0
10_3878	690931	191834	1220	0.0	0.0	120.0
10_3879	691127	191476	1220	0.0	0.0	120.0
10_3880	691344	191074	1220	0.0	0.0	120.0

10_3881	691552	190661	1220	0.0	0.0	120.0

Ground Control File - meters

A	690058.740112	191136.824623	534.945284
B	690594.772639	191528.651410	444.984177
C	690779.553724	190960.170062	477.873006
D	690834.112283	190928.775784	470.686634
E	690696.960802	190386.255894	525.715492
F	691187.184614	190613.227684	452.887407
G	691046.142550	191666.565025	479.556738
H	691190.917544	191129.367569	451.077979
I	691265.177333	190947.113868	456.734270

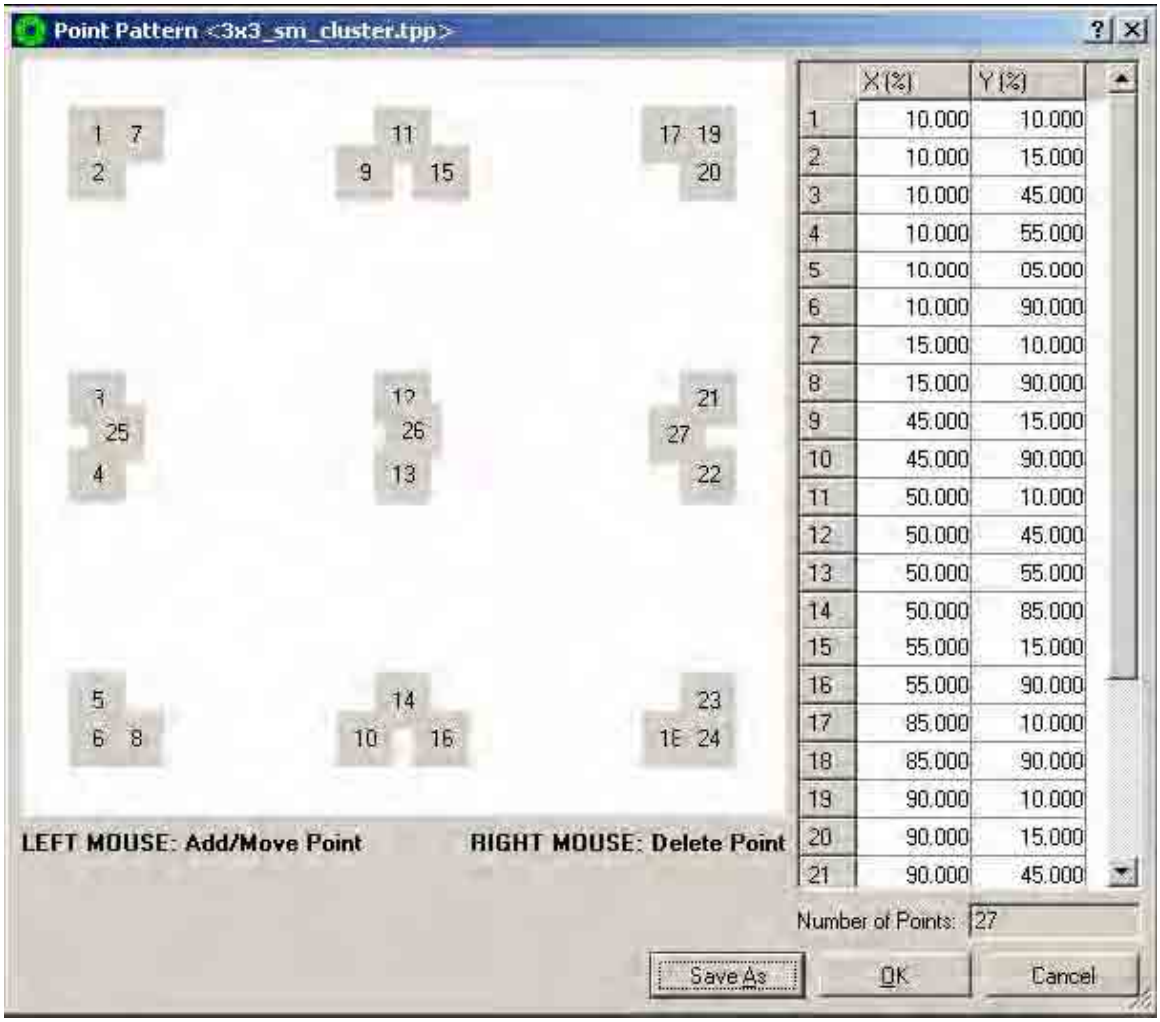
AGPS File - meters

8_3815	690226.49394	191426.86303	1212.73767
8_3816	690427.19857	191065.66007	1211.33235
8_3817	690627.95586	190715.56034	1206.97167
8_3818	690831.08592	190366.18329	1208.33074
10_3878	690933.34525	191835.85310	1208.32511
10_3879	691130.89062	191471.01395	1213.26803
10_3880	691341.68479	191071.05346	1215.09243
10_3881	691556.35216	190665.60143	1219.46747

6. APM Tie Point Pattern Files

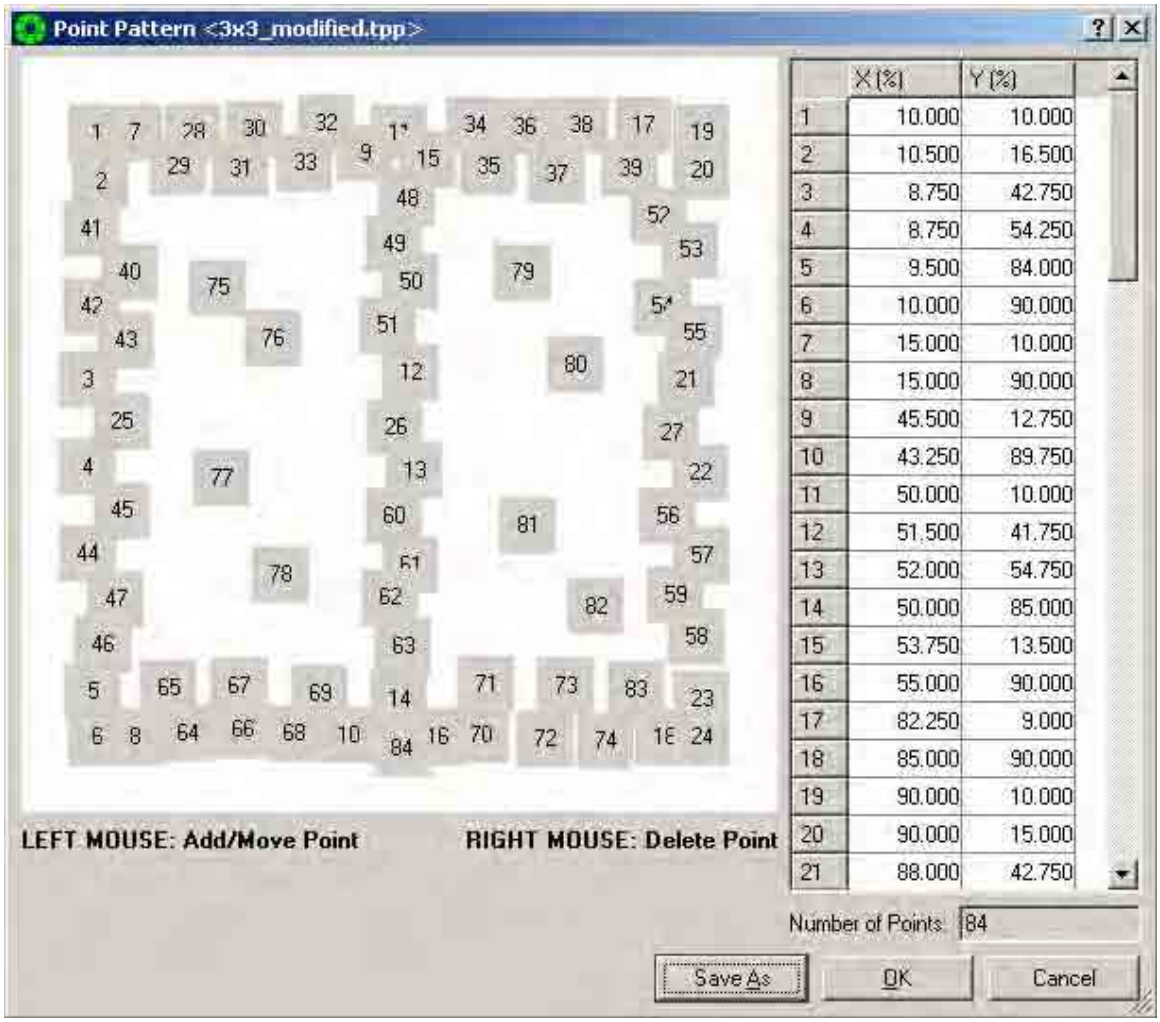
The SOCET SET APM module can be run with virtually any tie point pattern (TPP). Two different pattern files are shown below: 3x3_sm_cluster and 3x3_modified. With automatic blunder elimination and self-calibration, a dense TPP can be used to ensure sufficient redundancy and coverage when image points are eliminated by BINGO. The additional (computer) time required to generate the points will have the advantage of eliminating or severely reducing the need for the operator to measure image points manually; only ground control points would need to be interactively measured.

The "**3x3_sm_cluster.tpp**" file will produce redundant points at the classical von Gruber locations, but might not have an ideal point distribution for the computation of additional camera parameters and the subsequent elimination of the image deformation.



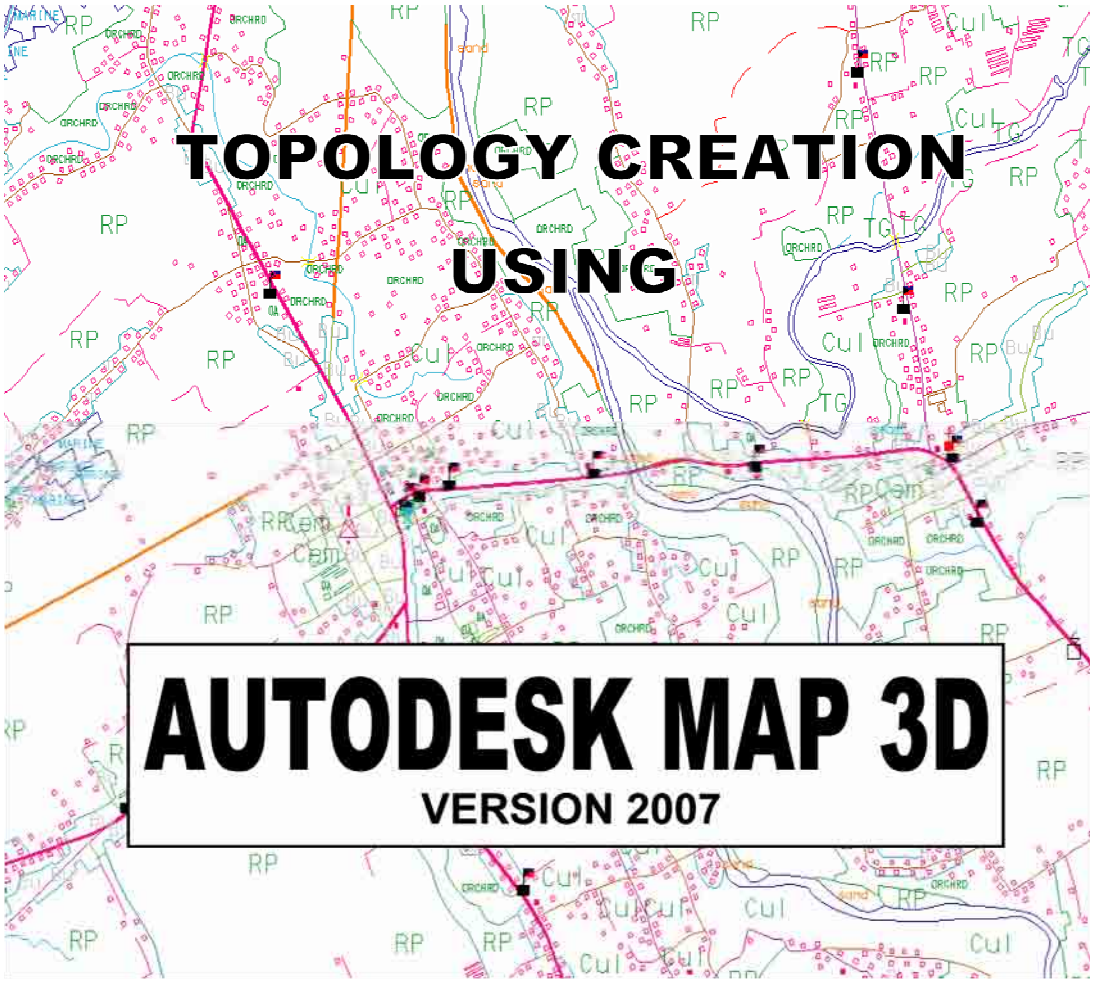
	X(%)	Y(%)
1	10.000	10.000
2	10.000	15.000
3	10.000	45.000
4	10.000	55.000
5	10.000	05.000
6	10.000	90.000
7	15.000	10.000
8	15.000	90.000
9	45.000	15.000
10	45.000	90.000
11	50.000	10.000
12	50.000	45.000
13	50.000	55.000
14	50.000	85.000
15	55.000	15.000
16	55.000	90.000
17	85.000	10.000
18	85.000	90.000
19	90.000	10.000
20	90.000	15.000
21	90.000	45.000

The "**3x3_modified.tpp**" file will produce redundant points at the classical von Gruber locations and along the critical multi-ray locations. This generates a uniform point distribution which will allow for a more precise computation of additional camera parameters and the subsequent elimination of the image deformation.



	X (%)	Y (%)
1	10.000	10.000
2	10.500	16.500
3	8.750	42.750
4	8.750	54.250
5	9.500	84.000
6	10.000	90.000
7	15.000	10.000
8	15.000	90.000
9	45.500	12.750
10	43.250	89.750
11	50.000	10.000
12	51.500	41.750
13	52.000	54.750
14	50.000	85.000
15	53.750	13.500
16	55.000	90.000
17	82.250	9.000
18	85.000	90.000
19	90.000	10.000
20	90.000	15.000
21	88.000	42.750

THE STUDY ON MAPPING POLICY AND TOPOGRAPHIC MAPPING FOR THE INTEGRATED NATIONAL DEVELOPMENT PLAN OF THE PHILIPPINES



EDITION 1

Table of Contents

1. Introduction

Topology, which describes how nodes, links (lines), and polygons connect and relate to each other, forms the basis for advanced GIS functions, such as network tracing and spatial analysis. In Autodesk Map 3D, you can use a map-based topology to create, modify, and query topology in a drawing. Tools are available to detect errors in the topology, to correct these errors, and then to re-create a topology. You can create three types of topologies: node, network, and polygon, and use these topologies to perform spatial analysis, including network tracing (shortest-path routing between two points, best route analysis between two or more points, and flood tracing), polygon overlay, and polygon buffer generation. You can also determine conditions of adjacency (what is next to what), containment (what is enclosed by what), and proximity (how close something is to something else). Topology information is stored as object data on each element that makes up the topology.

Autodesk Map 3D does not support topology data that spans several drawing files (such as tiled drawings) unless the necessary geometry is combined in the current drawing. You can create such a topology by retrieving the required geometry from attached drawings and creating the topology in the current drawing.

2. Topology

TOPOLOGY is used for evaluating suitability and capability, for estimating and predicting, and for interpreting features within a map. It refers to techniques that determine the distribution of features over a network or area, and the relationships between those features.

Spatial analysis is the process of extracting or creating new information about a set of geographic features. The location, proximity, and orientation of objects can be analyzed with spatial analysis.

Geographic analysis identifies conditions at a geographic location, in a spatial area, or along a linear network, and predicts the effects of future events on these features.

Polygon topology focuses on area-based relationships in which every area forms a polygon and each polygon in a topology consists of a set of links (figure 1.1). A polygon in a topology has a centroid, which is a point or block element within the polygon, and contains information about the area it encloses.

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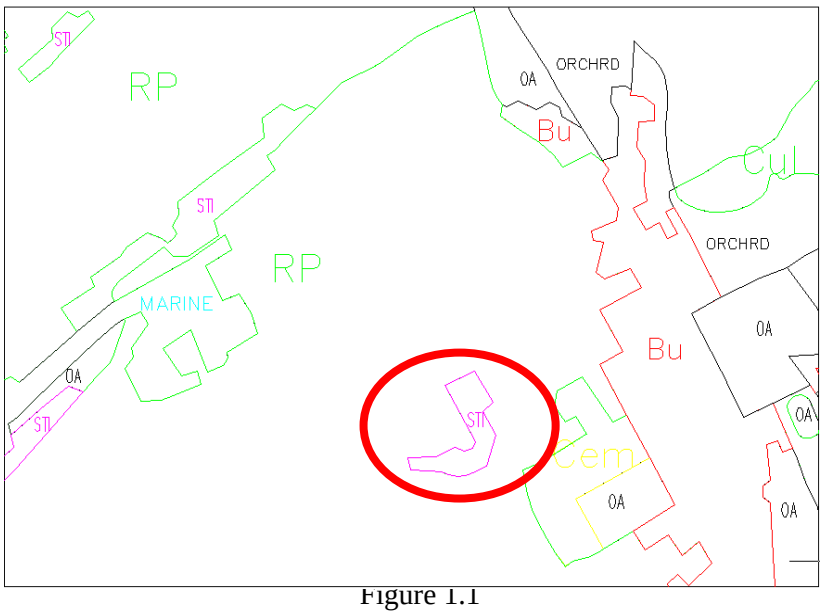


Figure 1.1
A polygon consists of a set of links

3. Data Classification

Figure 2.1
Portion of 3033-II Dagupan

Classify the data according to type based on the specification for digital topographic data acquisition:

3.1 Polygon Data –

This includes geographic features particularly vegetations, land classification and other existing features enclosed in polygon.

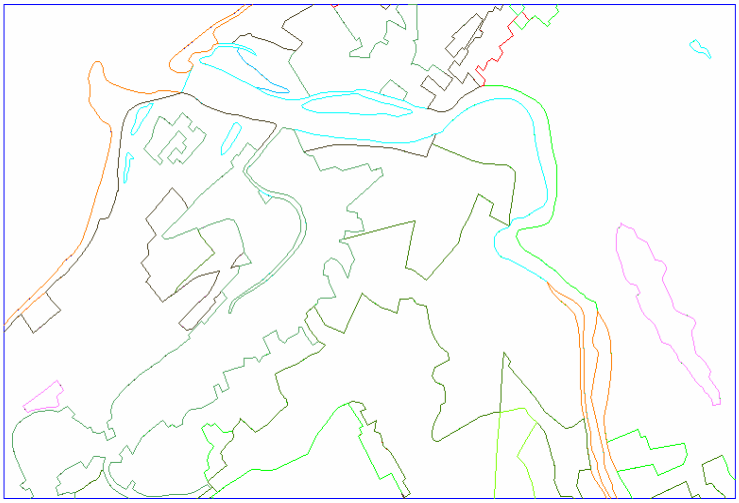


Figure 3.1
Polygon Data

3.2 Point Data –

This includes symbols, infrastructures and other existing structures.

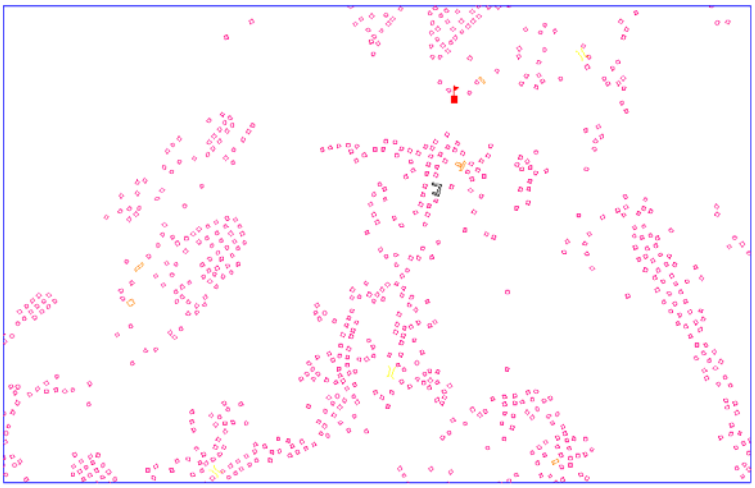
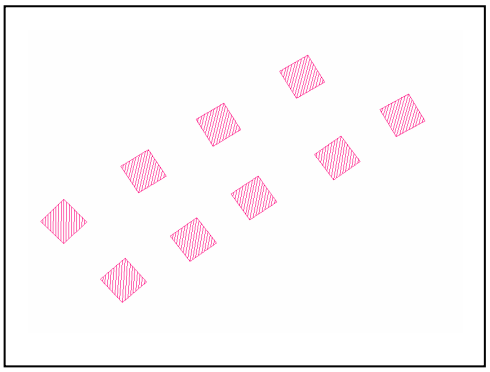


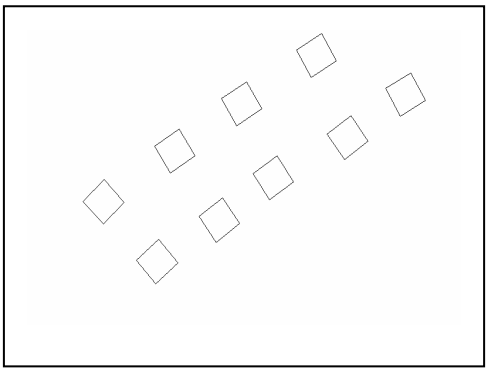
Figure 3.2

CHANGING 3D FACES TO POLYLINE

Since the layers for symbols are in 3D faces it is necessary to change it to polyline.



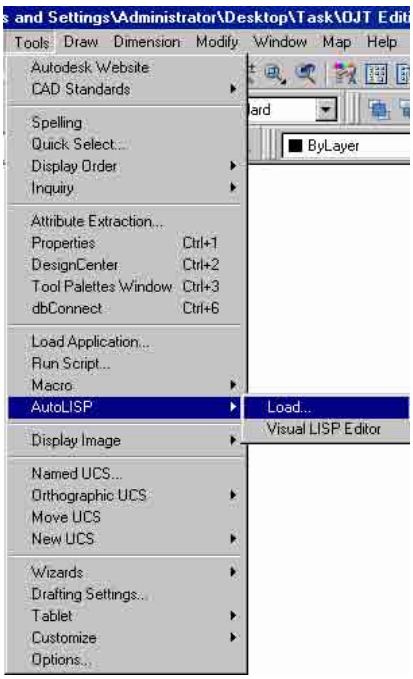
3D faces



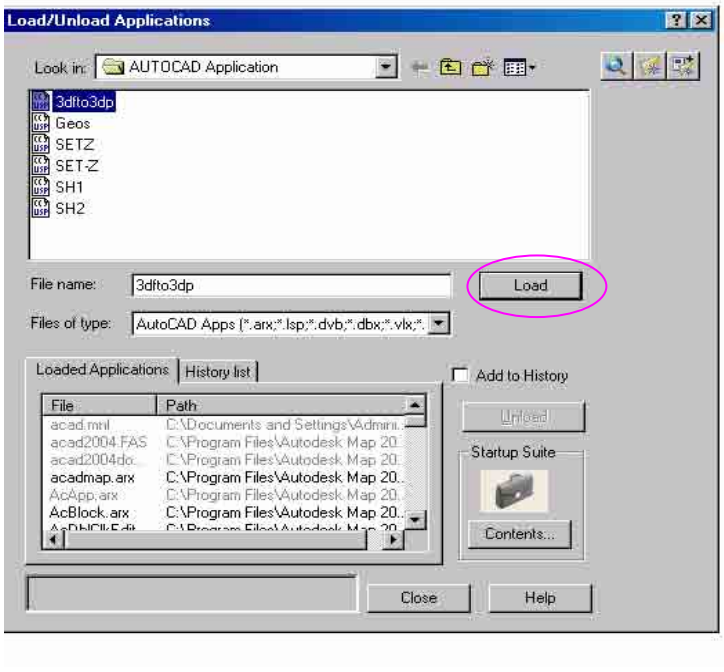
Polyline

Explode the 3D faces
Quick select line data to delete the shaded portion

Load Application



Load the 3dtos3dp
Then Click Load



Select object
Then Explode
Join the line to formulate as one polygon

3.3 Line data –

This include line features such as roads, railways, power transmission line, pipe line, coast line, streams, rivers, municipal and provincial boundaries etc.

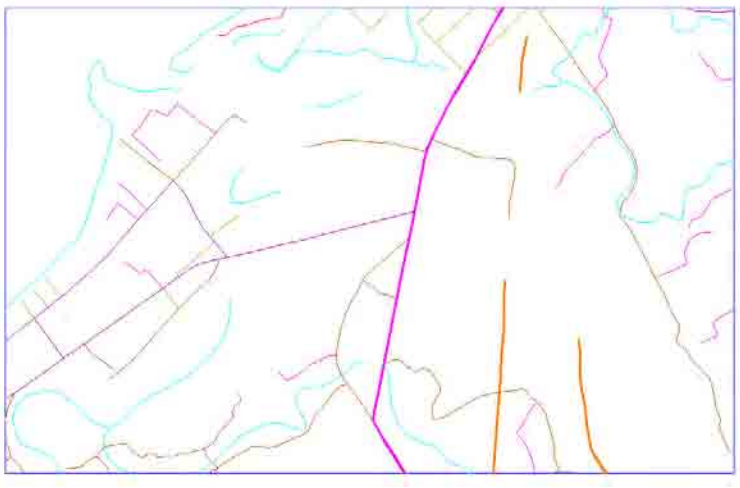


Figure 3.3
Line Data

3.4 Text Data –

This includes administrative names such as municipal and barangay names, geographic names, contour values, river names etc.

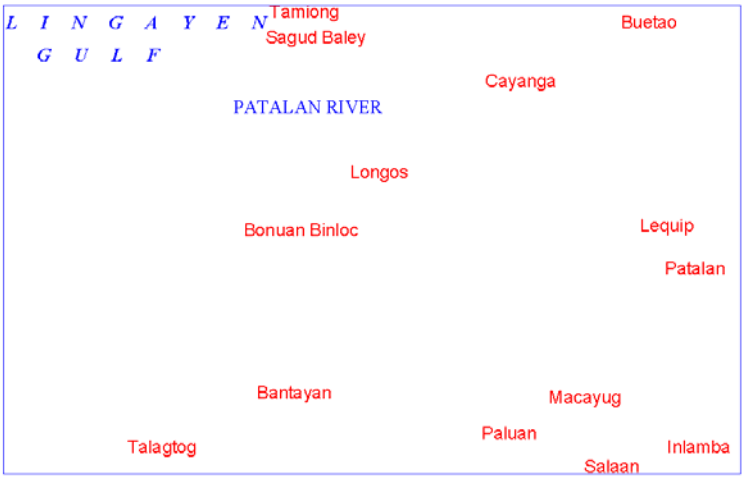


Figure 3.4
Text Data

3.5 Contour Data –

It includes intermediate, index and supplementary contours.

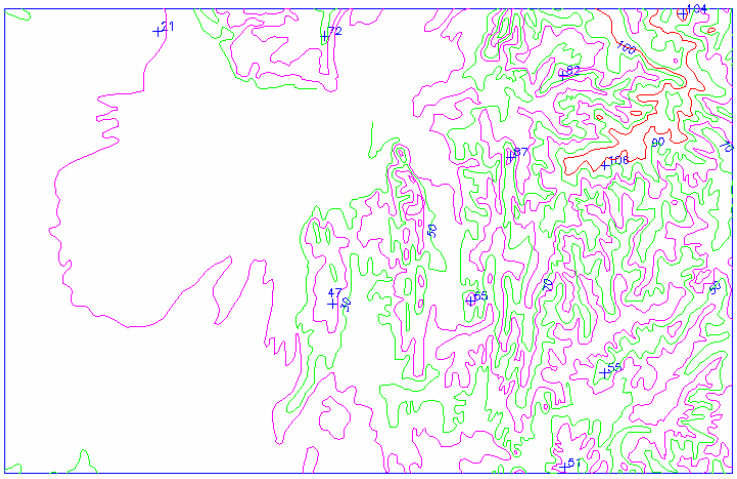


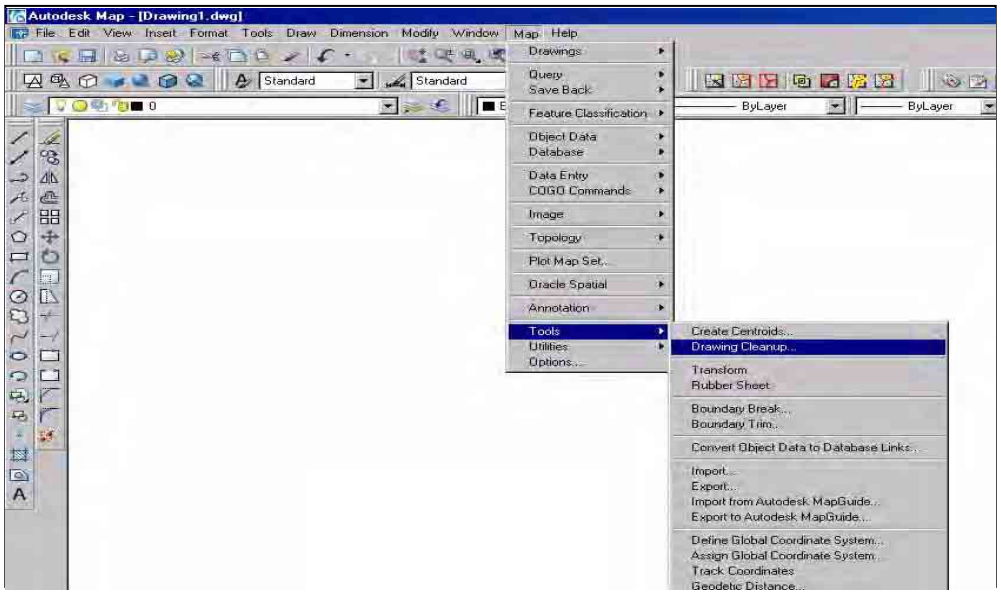
Figure 3.5
Contour Data

4. Drawing Clean-up

Drawing cleanup is a process of simplifying and removing unnecessary detail from your map. Drawing cleanup tools is used to correct digitizing and scanning errors such as clustered nodes, duplicate objects, unbroken intersections, or undershoots.

Drawing cleanup feature is used to improve the accuracy of your map and correct errors resulting from surveying, digitizing, scanning, or inaccurate drawing.

Note: Drawing clean-up is highly recommended before using topology.



1. There must be no gaps, intersections, or overlaps between any of the line work in a polygon topology.

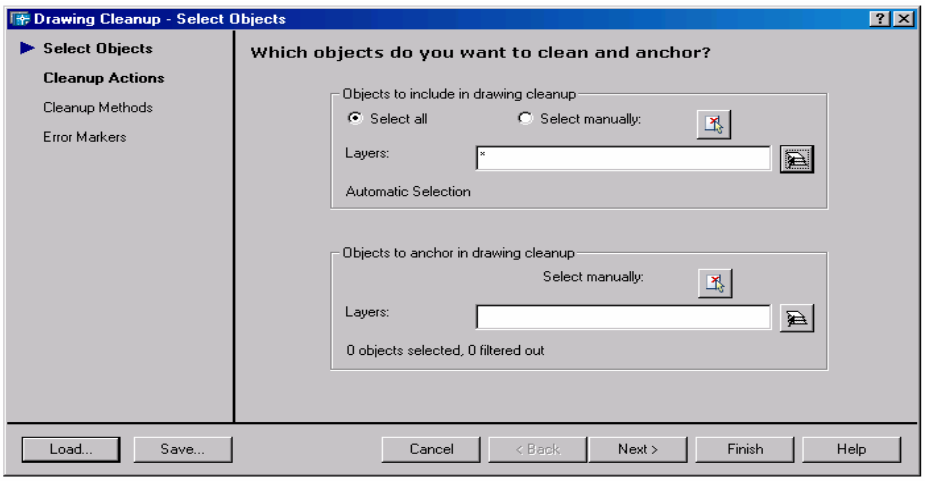
2. There must be no zero length objects or areas with missing centroids.

3. The polylines must join creating a single object.

4.1 Procedure

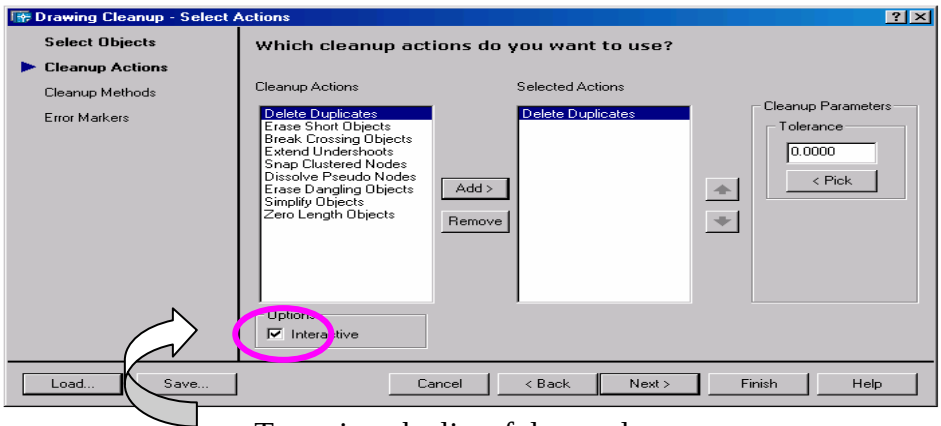
1. SELECT OBJECTS

Select necessary layers to edit



2. CLEANUP PARAMETERS

Specify the types of errors to detect, specify cleanup parameters such as tolerance, and indicate to correct errors automatically,



4.2 Cleanup Actions

To review the list of detected errors in order to correct, mark, or remove errors interactively

1. Delete Duplicates – deletes one of the objects that share the same start and end points as well as all other points within the tolerance distance.

2. Erase Short Objects - erases objects shorter than the specified tolerance.

3. Break Crossing Objects - breaks objects that intersect each other with no node at the crossing. Breaks the crossing objects and creates a node at the crossing.

4. Extend Undershoots – extend object that cross the other object within the specified tolerance radius.

Note: Select Break Target check box in order to break target linear object intersections.

5. Apparent Intersection – connects objects that does not intersect and creating node to the intersected area.

6. Snap Clustered Nodes – snap endpoints to the centermost node within the specified tolerance radius distance of each other.

7. Dissolve Pseudo Nodes – dissolves shared node by two objects and join.

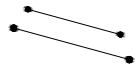
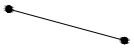
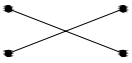
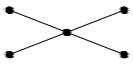
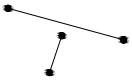
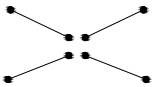
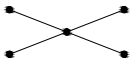
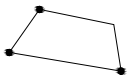
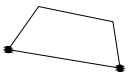
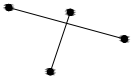
8. Erase Dangling Objects – erases the objects with at least one end point that is not shared by another object

Note that it is often a good idea to use the Break Crossing Objects action before doing the process.

9. Simplify Objects – Simplifies and reduces the number of points in a detailed and complex polylines by removing all interior nodes that fall within the specified tolerance.

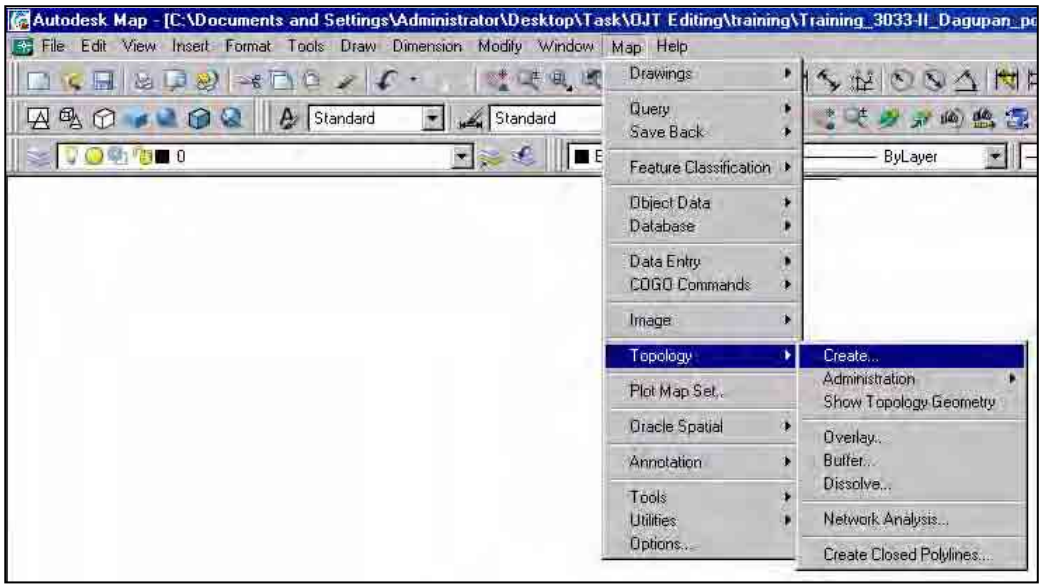
10. Zero Length Objects - Finds polylines with start and end points but zero length, as well as polylines with only a start vertex and removes them.

5. Procedure in creating topology.

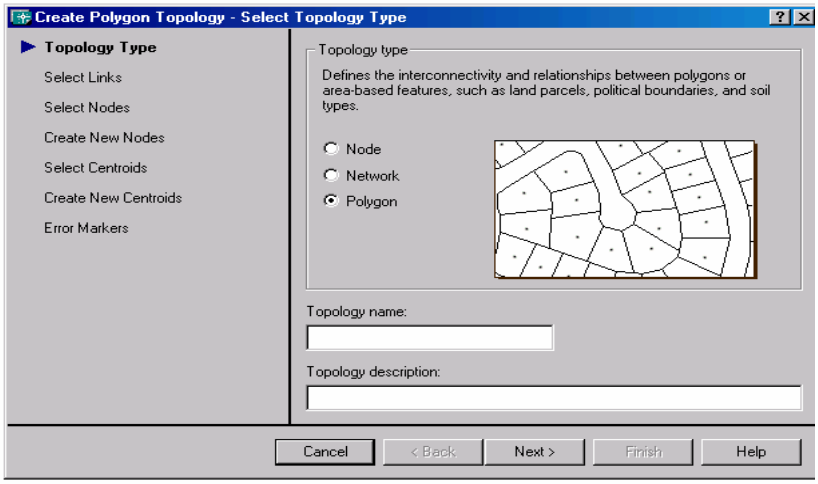
	BEFORE	AFTER	PRIORITY AND TOLERANCE	REMARKS
1			0.0 m	Duplicate Objects
2			if required	Erase Short Objects
3			------	Break Crossing Objects
4			0.5 - 1.0 m	Extend Undershoots
5			0.1 m	Apparent Intersection
6			if required	Snap Clustered Nodes
7			for contour line	Dissolve Pseudo Nodes
8			0.5 m	Erase Dangling Objects
9			for contour line	Simplify Objects
10			-----	Erase Zero Length Objects
11			for contour line	Weed Polyline

Note: Tolerance Depends on Map Scale and Approximate
Priority Depends on Map Scale

From the menu bar, choose Map>Topology >Create

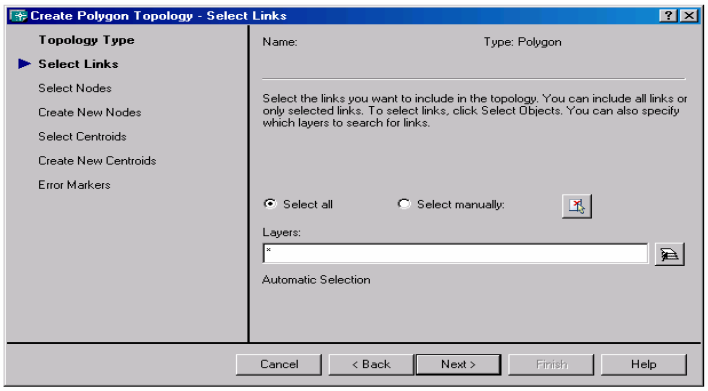


Select Topology Type dialog box
Enter a name and description for the new topology
Choose **node, network** or **polygon** to create

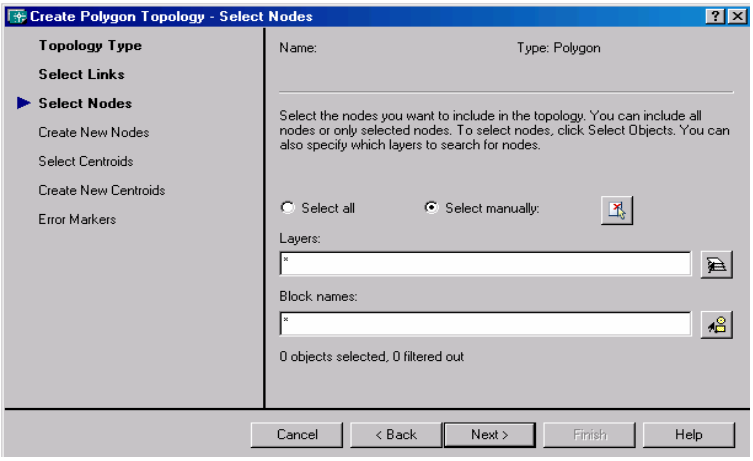


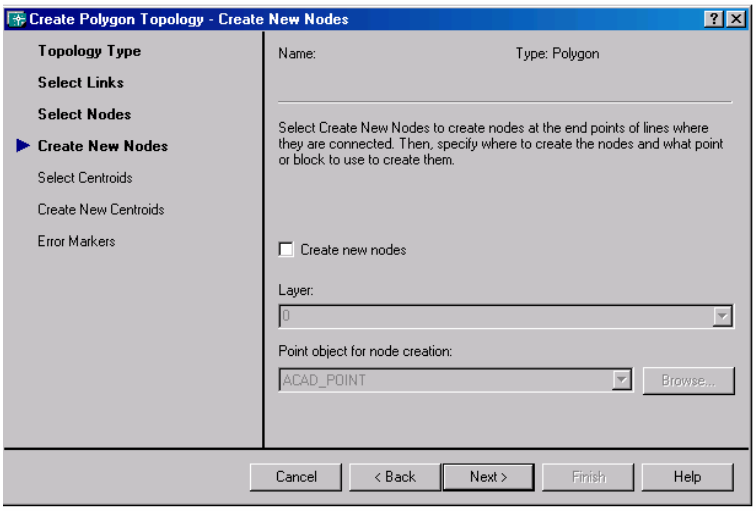
Select necessary layers or object to search for links

For Polygon

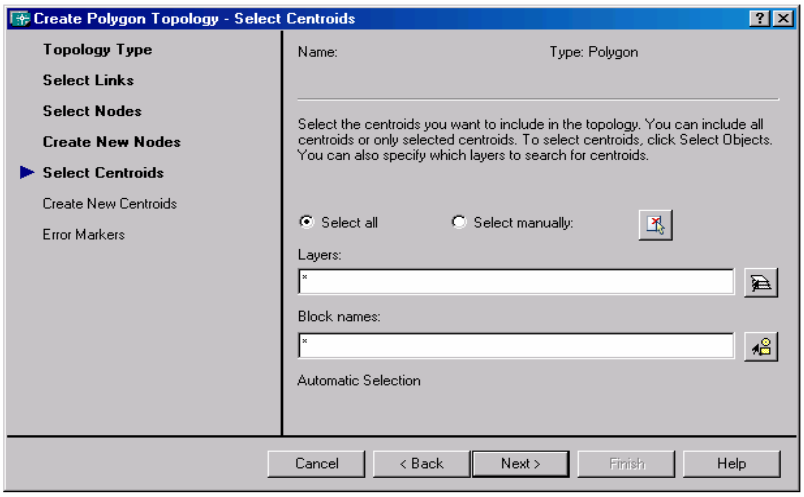


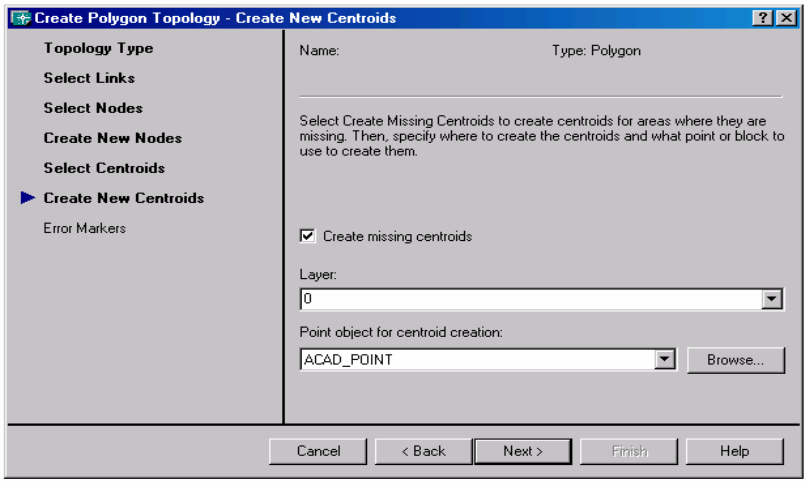
For Nodes



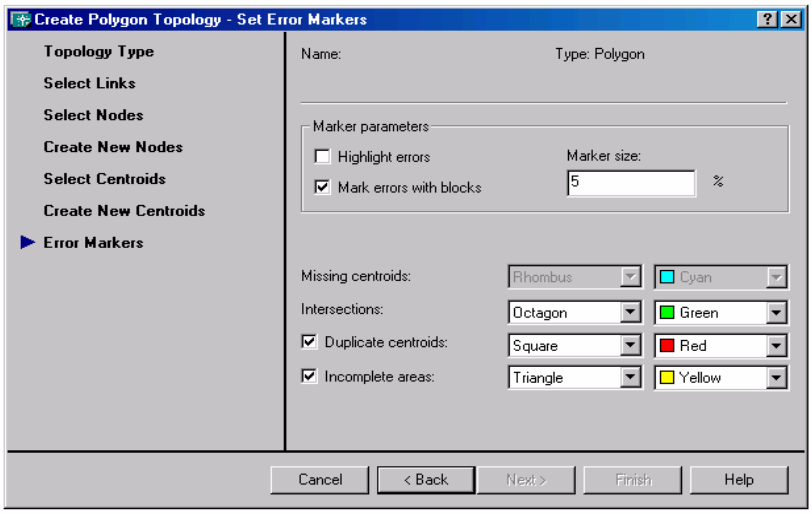


For Centroid

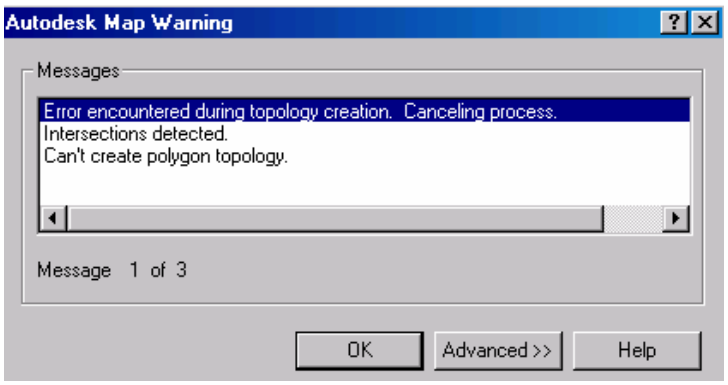




Error Markers



Then Click Finish



Note: You cannot create a polygon topology from ellipses or from closed Polyline that share an edge or intersection with other polygons. You must explode a closed polyline before you create the topology.

If there are some errors encountered in the data, it automatically gives warning message and highlights the errors.

Sources of error

1. Missing centroid
2. Duplicate centroid
3. Incomplete areas

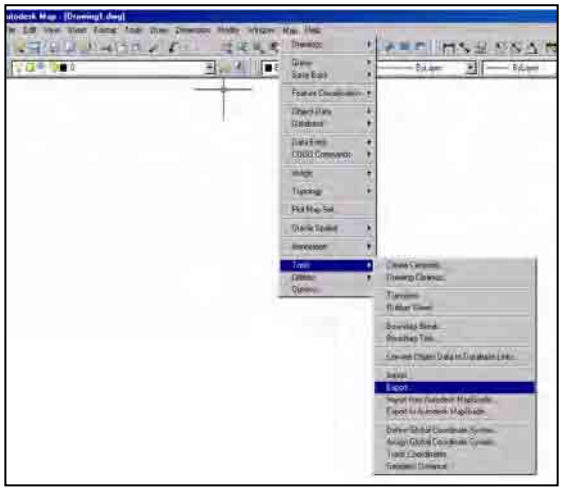
Repeat the process in creating the topology until the topology successfully created.

Some information included in the topology

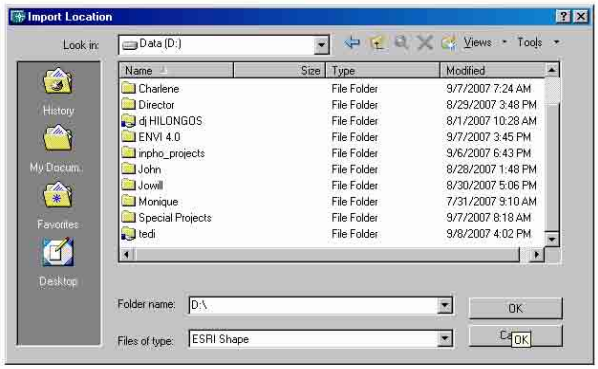
- Basic Information - name, description, and type (node, network, or polygon).
- Extents- coordinate of the lower-left corner and upper-right corner of the bounding rectangle for the topology.
- Object Counts - number of nodes, links, and polygons in the topology.
- Details – about area, perimeter, and length, including totals, averages, minimum values, maximum values, variance, and deviation.

6. Data conversion from Drawing file to Shape file format

Map> Tools > Export



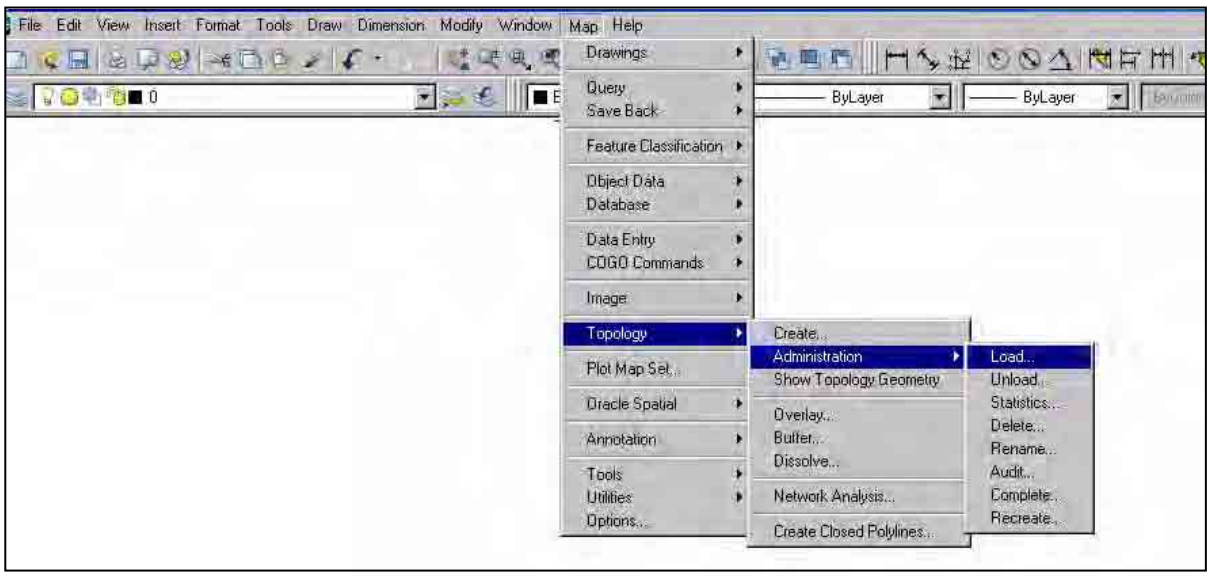
Change the file type to shape file



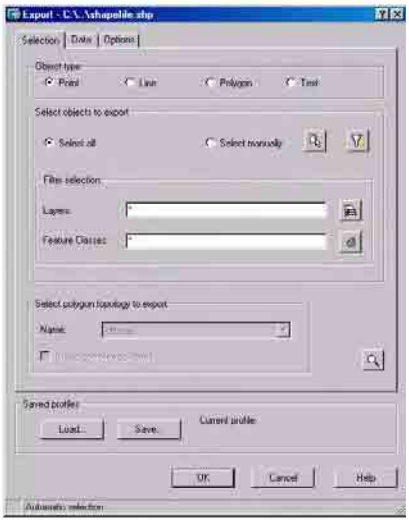
Each element of the network topology has different object data values. Network topology information is stored on the links and nodes as object data.

Using the topology administration tools you can load, unload, rename, and delete an existing topology, audit or check the status of a topology to ensure its integrity, and, if a topology was edited with commands other than the topology editing tools, you can also recreate it. The tools can also get statistics on the topologies in an active project, highlight all objects in a topology, and highlight all topologies for a selected object

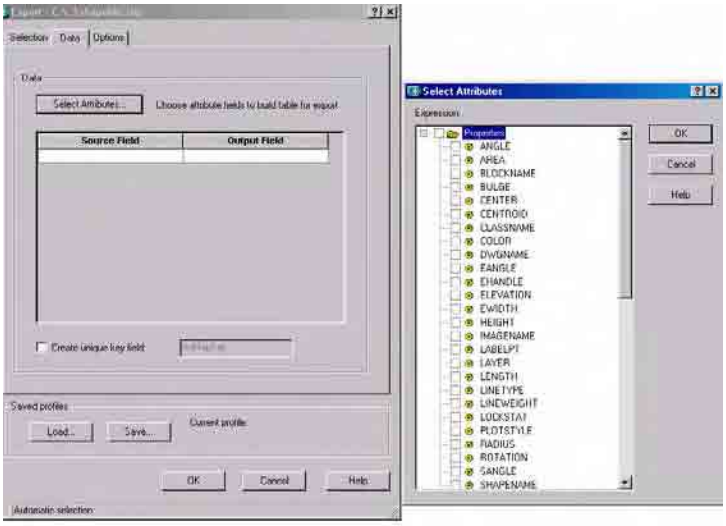
Map > Topology > Administration > Load



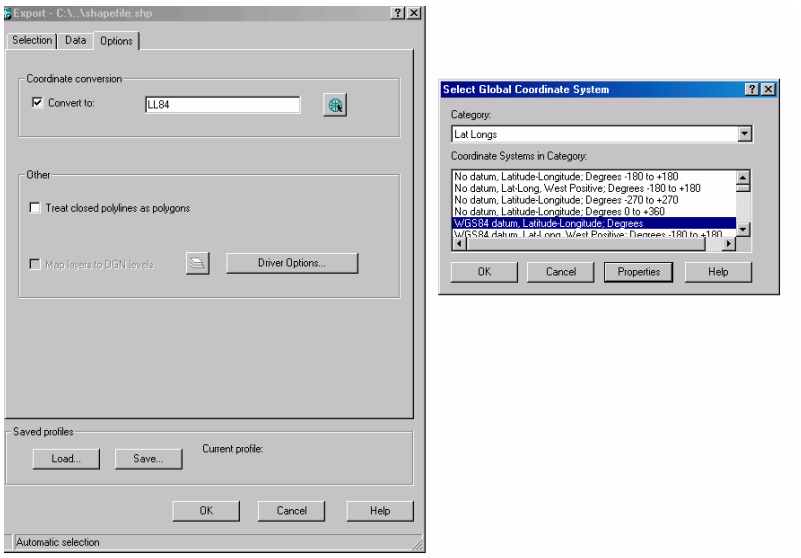
Select Object type to export

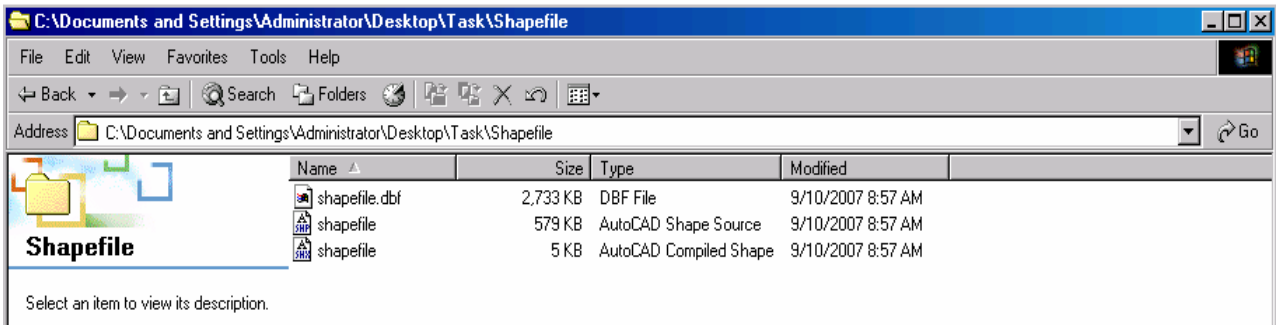


You can also choose attributes field to build table for export



In changing the coordinate conversion just check the *Convert to* to set the specified coordinate system and category.



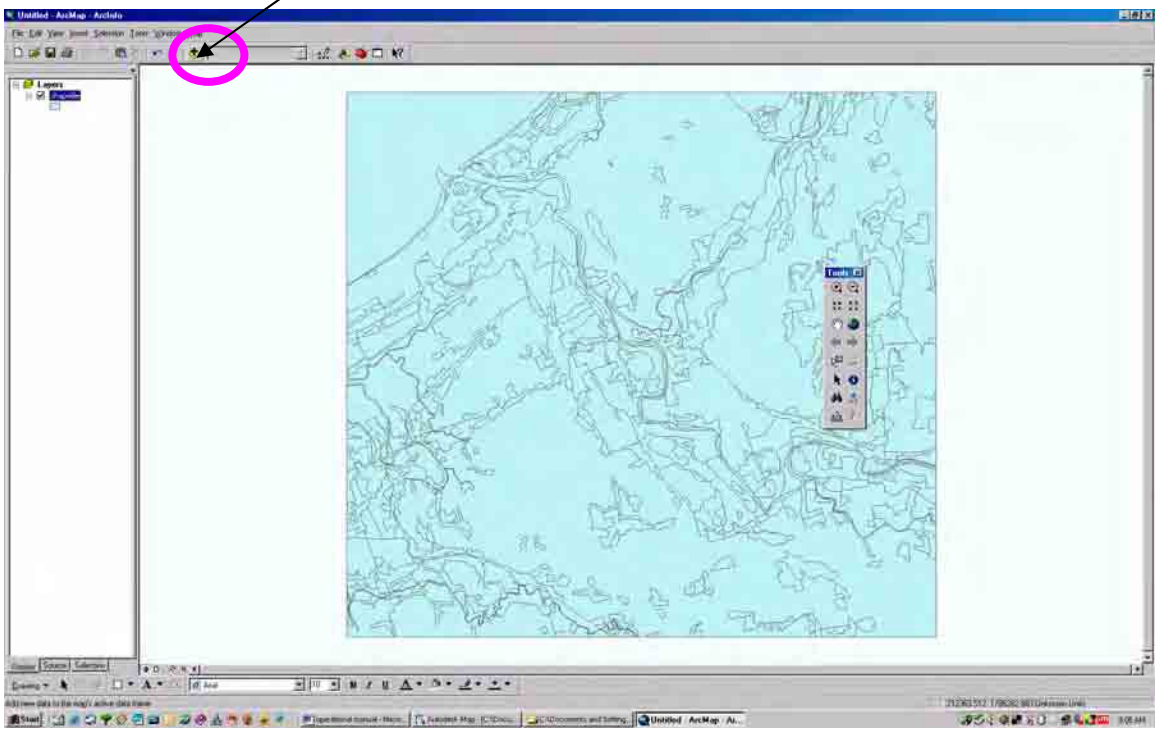


Shape file will formulate the following format:

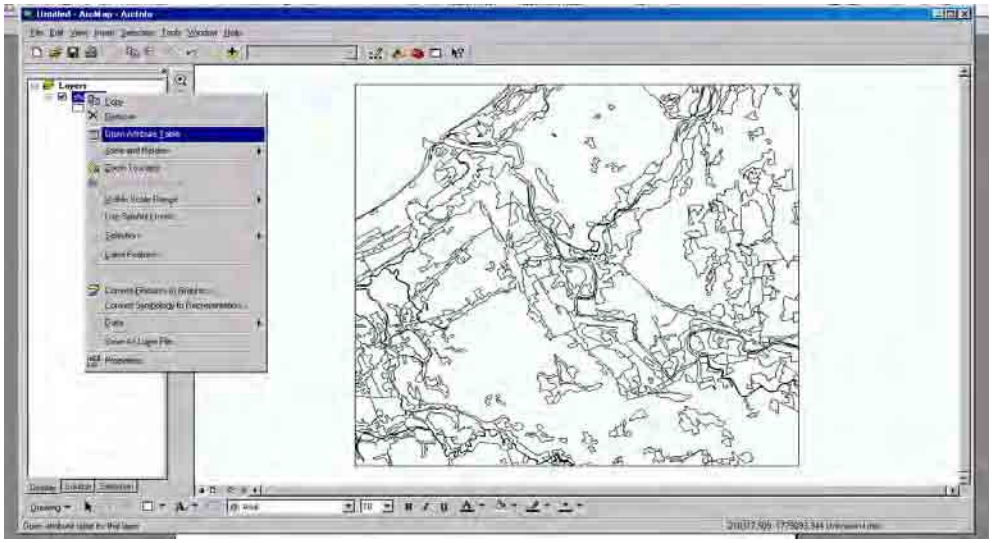
DBF file
AutoCAD Shape Source
AutoCAD Compiled Shape

Open the shape file data using ARCMAP

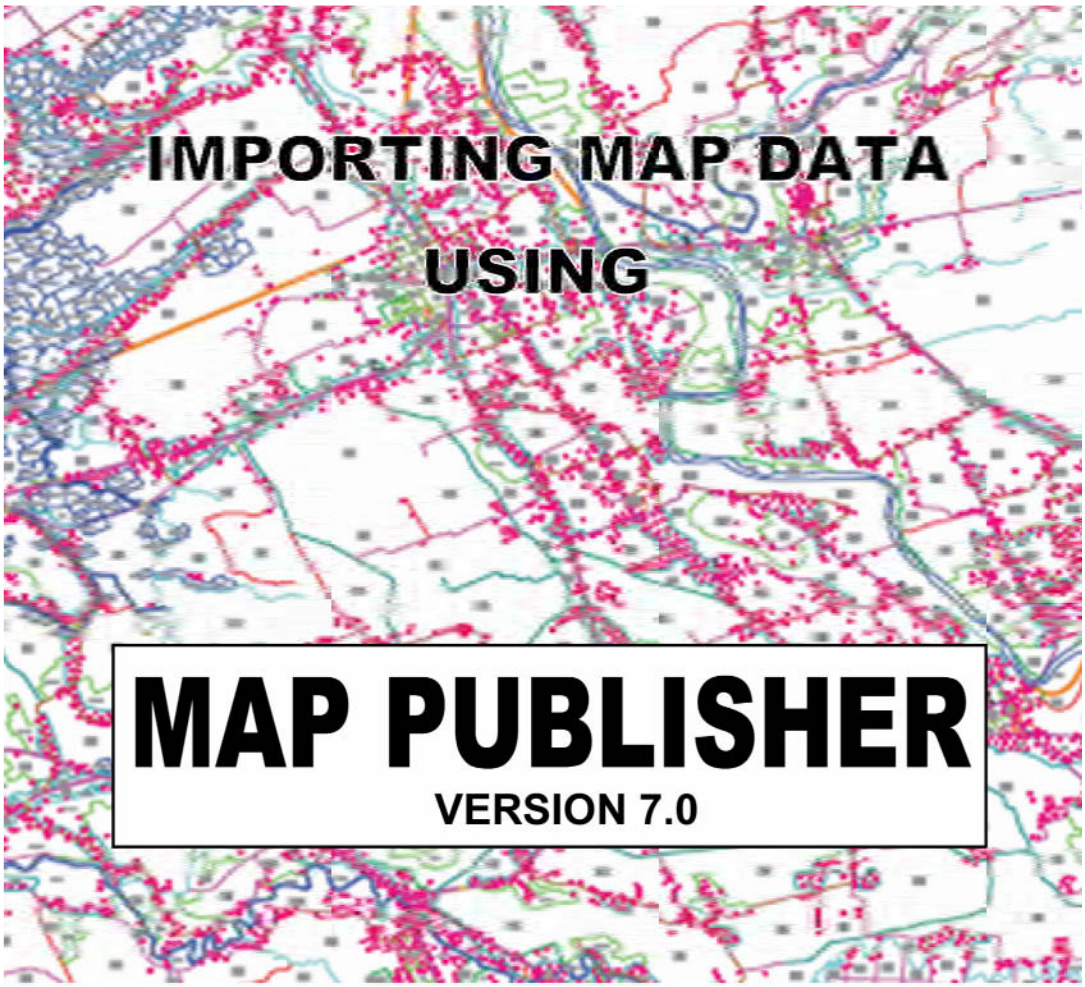
Click the *add data* and open the shape file



To display the attribute data
In the layer menu<right click < open attribute table



THE STUDY ON MAPPING POLICY AND TOPOGRAPHIC MAPPING FOR THE INTEGRATED NATIONAL DEVELOPMENT PLAN OF THE PHILIPPINES



EDITION 1

Table of Contents

1. Introduction

Combined with Adobe Illustrator, MAPublisher has revolutionized the art of mapmaking by allowing spatial data files to be used to enhanced maps inside a vector graphics program. MAPublisher allows all your cartographic tasks to be performed where they should be done, in a powerful graphics environment.

Together MAPublisher and Adobe Illustrator will give you a totally integrated cartographic design software system with graphic tools and geographic functions present in the same work environment.

2. Working with Custom Coordinate Systems

A coordinate system within MAPublisher defines a mathematical model of the conversion between a specific location on the earth and a set of coordinates. Coordinate system definitions are specified by a set of parameters that define this mathematical model, including the earth model (ellipsoid or datum), the units used to measure the coordinates, the projection type, and any parameters specific to the projection type. Coordinate systems may be extracted from input feature data sources, may come predefined or may be defined by MAPublisher users. MAPublisher allows output coordinate systems that are different than the input ones to be specified and performs the required coordinate conversions when necessary.

MAPublisher currently contains over 4000 coordinate systems which are defined by a wide range of differing projections, datums and ellipsoids. Even though the current list of selections is comprehensive there may be instances where the end user may wish to add a brand new coordinate system to meet their particular needs, or perhaps to modify an existing definition to change the units for example. In either case the coordinate system database files that accompany MAPublisher may be edited directly by the end user so that new/modifed entries can be permanently stored within the defined list of coordinate system options.

Before commencing the process of creating a custom coordinate system, ensure that Adobe Illustrator is closed.

3. Creating a Custom Coordinate System

The following pages will deal with the process of defining a custom coordinate system via manually editing the coordinate system definition files. For advanced users, please refer to the Safe Software document entitled ***`FME _CS_Support.pdf'*** which is located in the Documentation folder of the MAPublisher CD, or at the following link:
http://www.avenza.com/support.documentation.html
Certain procedures in this section may require additional instructions which can be found in this PDF.

Creating new or modifying existing coordinate systems is a two step process based on the editing the following files, "***LocalCoordSysDefs.fme***"and "***Coordsys.db***". The contents of these files may be viewed and edited in a simple text editor such as Notepad or SimpleText. ***It is strongly recommended that you backup the original versions of these files prior to attempting to edit or modify them.***

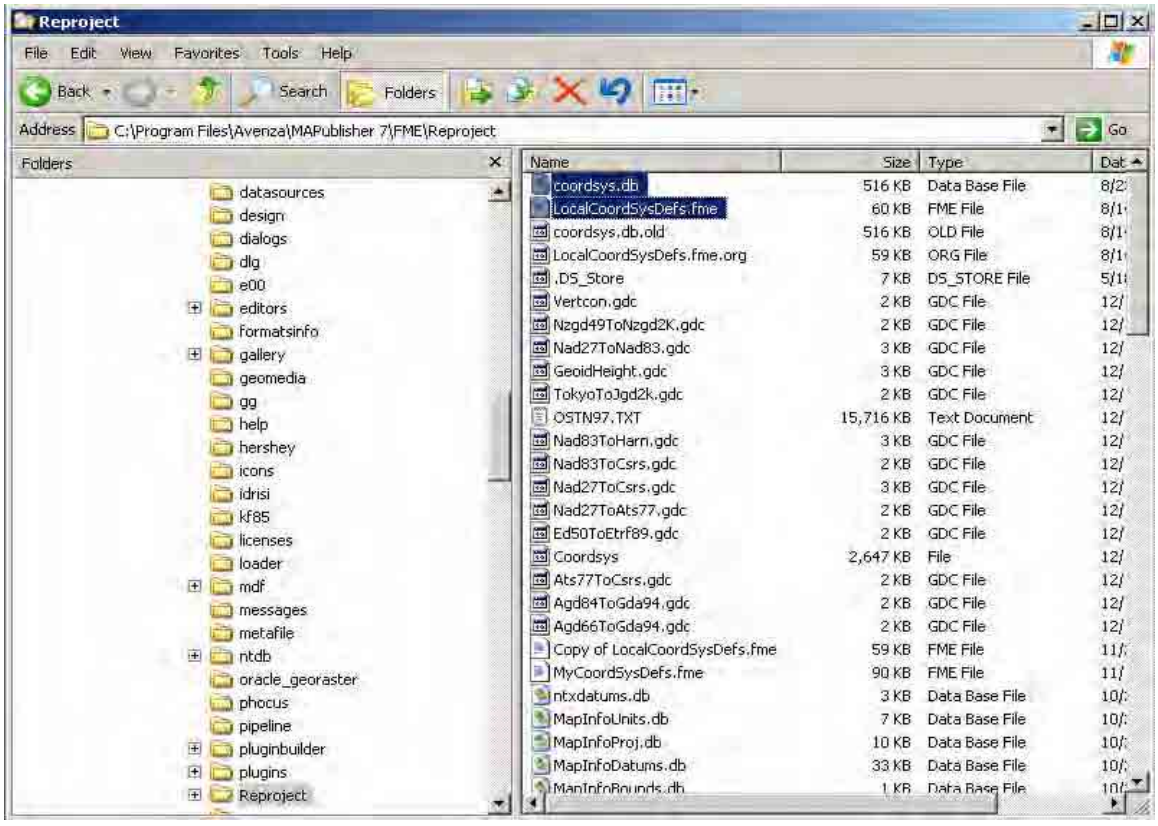
4. Defining the New Coordinate System

In order for a new coordinate system to be recognized within MAPublisher, the coordinate system must first be defined within the "***LocalCoordSysDef.fme***" file. This file is typically located in the following directory:

Windows: C:\ProgramFiles\Avenza\MAPublisher\FME\reproject

Macintosh: Library:Frameworks:FMEObjects.Framework:Resources:FMECore.bundle*:
Contents:Resources:FME_HOME:Reproject

**Note that if this folder is `packed', you must `Ctrl-click' the icon, and select `Show Package Contents' from the menu.*

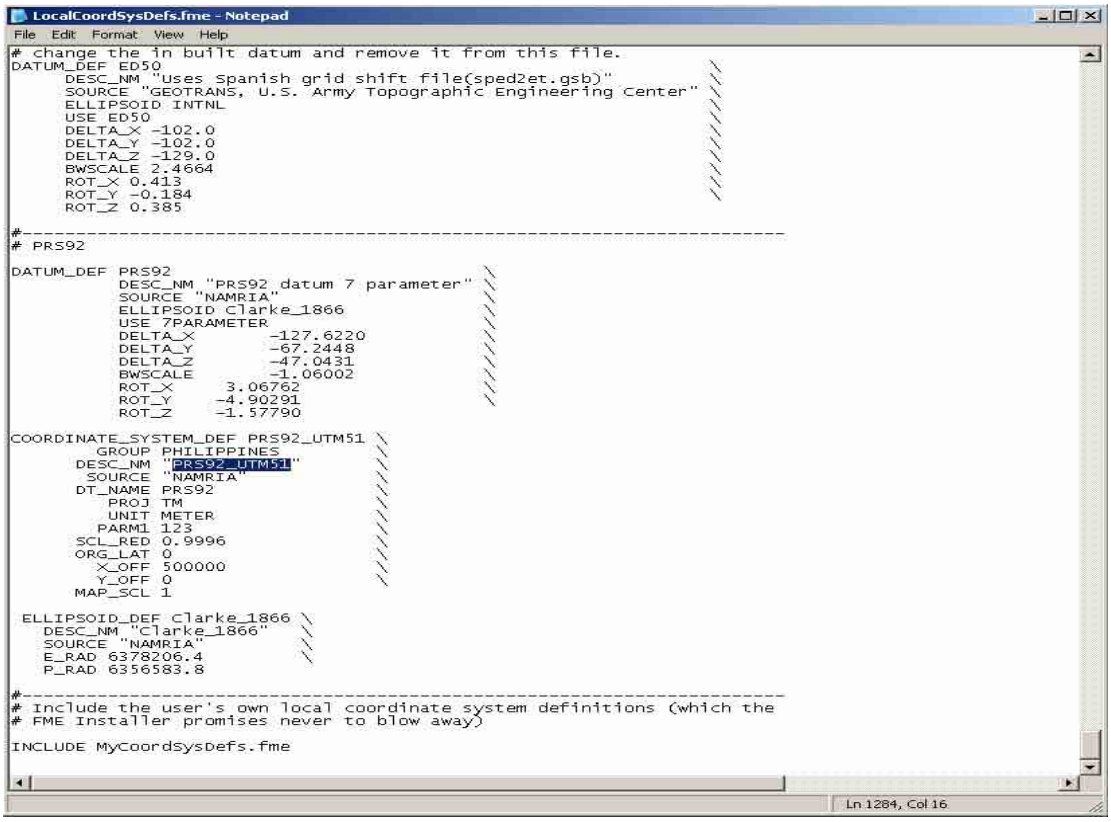


Open this file in a text editor. This file contains the names and descriptions of all predefined coordinate systems.
Within it are a series of lines entitled:
"COORDINATE_SYSTEM_DEF", "DATUM_DEF", "ELLIPSOID_DEF", and "UNIT_DEF"
which define additional, site-specific coordinate systems.

As an example, the NAD83 based UTM Zone 12 coordinate system, defined in the "*LocalCoordSysDef.fme*" file, would be similar to the text below. The meanings of these values are described in(brackets).

```
COORDINATE_SYSTEM_DEF UTM12N83
\                       (CoordinateSystemName)
DT_NAME NAD83 \                                          (DatumName)
PROJ TM \                                                (ProjectionType)
UNIT METER \                                              (UnitType)
DESC_NM "NAD83 based on UTM Zone, meter" \               (DescriptiveName)
SOURCE "Source description" \                             (Sourceofthedefinition)
PARM1 -111.0
\                                                  (Additionalparameteruniqueforthiscoordi
natesystem)
SCL_RED 0.9996
\                                                (Additionalparameteruniqueforthiscoordinat
esystem)
ORG_LAT 0.0
\                                                  (Additionalparameteruniqueforthiscoordi
natesystem)
X_OFF 500000.0
\                                                 (Additionalparameteruniqueforthiscoordin
atesystem)
Y_OFF 0.0
\                                                      (Additionalparameteruniqueforthisc
oordinatesystem)
MAP_SCL 1.0
(Additionalparameteruniqueforthiscoordinatesystem)
```

LocalCoordSysDef.fme


LocalCoordSysDefs.fme - Notepad
File Edit Format View Help
change the in built datum and remove it from this file.
DATUM_DEF ED50 \
DESC_NM "Uses Spanish grid shift file(sped2et.gsb)" \
SOURCE "GEOTRANS, U.S. Army Topographic Engineering Center" \
ELLIPSOID INTNL \
USE ED50 \
DELTA_X -102.0 \
DELTA_Y -102.0 \
DELTA_Z -129.0 \
BWSCALE 2.4664 \
ROT_X 0.413 \
ROT_Y -0.184 \
ROT_Z 0.385
#----------
PRS92
DATUM_DEF PRS92 \
DESC_NM "PRS92 datum 7 parameter" \
SOURCE "NAMRIA" \
ELLIPSOID Clarke_1866 \
USE 7PARAMETER \
DELTA_X -127.6220 \
DELTA_Y -67.2448 \
DELTA_Z -47.0431 \
BWSCALE -1.06002 \
ROT_X 3.06762 \
ROT_Y -4.90291 \
ROT_Z -1.57790
COORDINATE_SYSTEM_DEF PRS92_UTM51 \
GROUP PHILIPPINES \
DESC_NM "PRS92_UTM51" \
SOURCE "NAMRIA" \
DT_NAME PRS92 \
PROJ TM \
UNIT METER \
PARM1 123 \
SCL_RED 0.9996 \
ORG_LAT 0 \
X_OFF 500000 \
Y_OFF 0 \
MAP_SCL 1
ELLIPSOID_DEF Clarke_1866 \
DESC_NM "Clarke_1866" \
SOURCE "NAMRIA" \
E_RAD 6378206.4 \
P_RAD 6356583.8
#----------
Include the user's own local coordinate system definitions (which the
FME Installer promises never to blow away)
INCLUDE MyCoordSysDefs.fme
Ln 1284, Col 16

5. Defining Coordinate System Variables

The following table provides an overview of the basic parameters required for defining a Local Coordinate System. Note that not all of the parameters shown above are required for all coordinate systems definitions. Please refer to pages 99-107 of the *`FME_CS_Support.pdf'* document for unique requirements of each projection type.

NAME	RANGE	DESCRIPTION	OPTIONAL
<coordSysName>	Any string	The name of the coordinate system being defined may be used to identify the coordinate system of a reader or writer.	No
<unit name>	See supported Coordinate Units (*page84)	The name of the units used to measure coordinates in the coordinate system.	No
<projType>	See supported ProjectionTypes (*page85)	The type of map projection used for this definition. Determines which additional parameters may need to be specified.	No
<parameter>	Dependent on the Projection Type selected	Each projection system makes use of a set of parameters.	No
<datumName>	See supported Datums (*page115)	The datum to be used for the projection. Either a datum or an ellipsoid must be specified for each coordinate system.	Yes
<ellipName>	See supported Ellipsoids (*page136)	The ellipsoid to be used for the projection Either a datum or an ellipsoid must be specified for each coordinate system.	Yes

**Refers to page number in the `FME_CS_Support.pdf'*

NAME	RANGE	DESCRIPTION	OPTIONAL
<quadrant>	-4..4	The quadrant of the Cartesian coordinate produced by the coordinate system. See Quadrant(*page140)	Yes
<descript. name>	any string	A descriptive name of the definition.	Yes
<source>	any string	Person or agency supplying the definition.	Yes

**Refers to page number in the `FME_CS_Support.pdf'*

6. Referencing the New Coordinate System

Once the definitions are defined in the "LocalCoordSysDef.fme" they are then referenced by the "***Coordsys.db***" file. This file is typically located in the following directory:

Windows: C:\ProgramFiles\Avenza\MAPublisher\FME\reproject

Macintosh: Library:Frameworks:FMEObjects.Framework:Resources:FMECore.bundle*:
Contents:Resources:FME_HOME

**Note that if this folder is `packed', you must Ctrl-click the icon, and select `Show Package Contents' from the dropdown.*

The "***Coordsys.db***" file contains the names and descriptions of all predefined coordinate systems. This is where you need to reference the coordinate system defined in the "***LocalCoordSysDef.fme***" file. Special attention must be given to naming conventions and to ensuring that the definition name, coordinate system description, units, and datum variables all coincide with parameters specified in the associated coordinate system definition. If you do not adhere to these principles, conflicts will occur during the startup process.

As an example, the NAD83 based UTM Zone 12 coordinate system, defined in the "***Coordsys.db***" file, would be similar to the text below.

UTM12N83 | NAD83 based on UTM Zone, meter | WORLD | NAD83 | | TM | METER

*[*CR]*
*[*CR] You must enter a carriage-return here*
The meanings of these values, in the same order as the text above, are as follows.

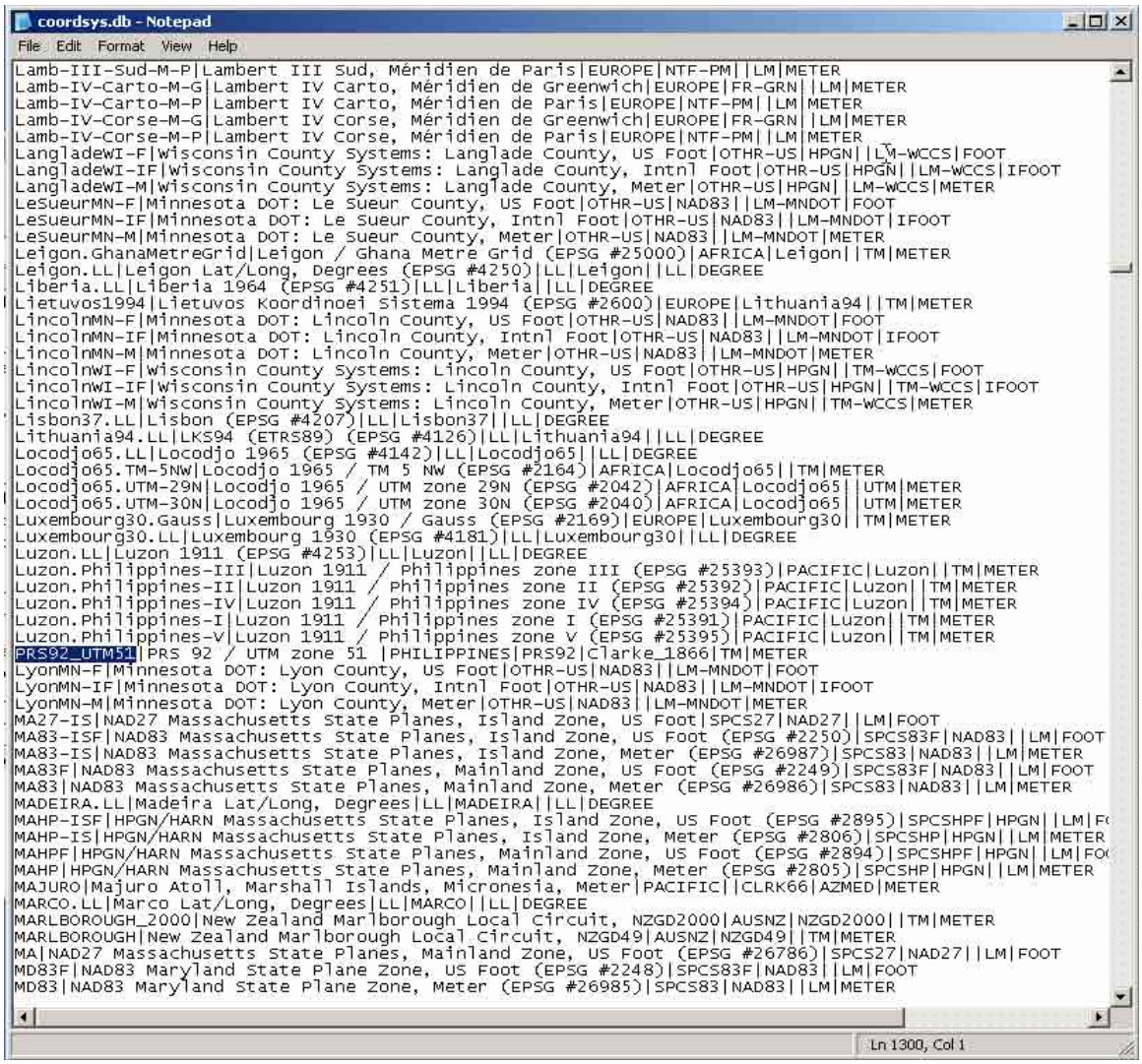
<CoordinateSystemName>|<DescriptionofCoordSystem>|<Group>|<Datum>|<Ellipsoid>|<Projection>|<Units>

Coordsys.db

PRS92_UTM51 |PRS 92 / UTM zone 51 |Philipines|PRS92|Clarke_1866|TM|METER

<CoordinateSystemName>|<DescriptionofCoordSystem>|<Group>|<Datum>|<Ellipsoid>|<Projection>|<Units>

*Note: The Coordinate System Name in the **Coordsys.db** should be the same name used in the DESC_NM and COORDINATE_SYSTEM_DEF of the **LocalCoordSysDef.fme.***



7. Accessing the New Coordinate System

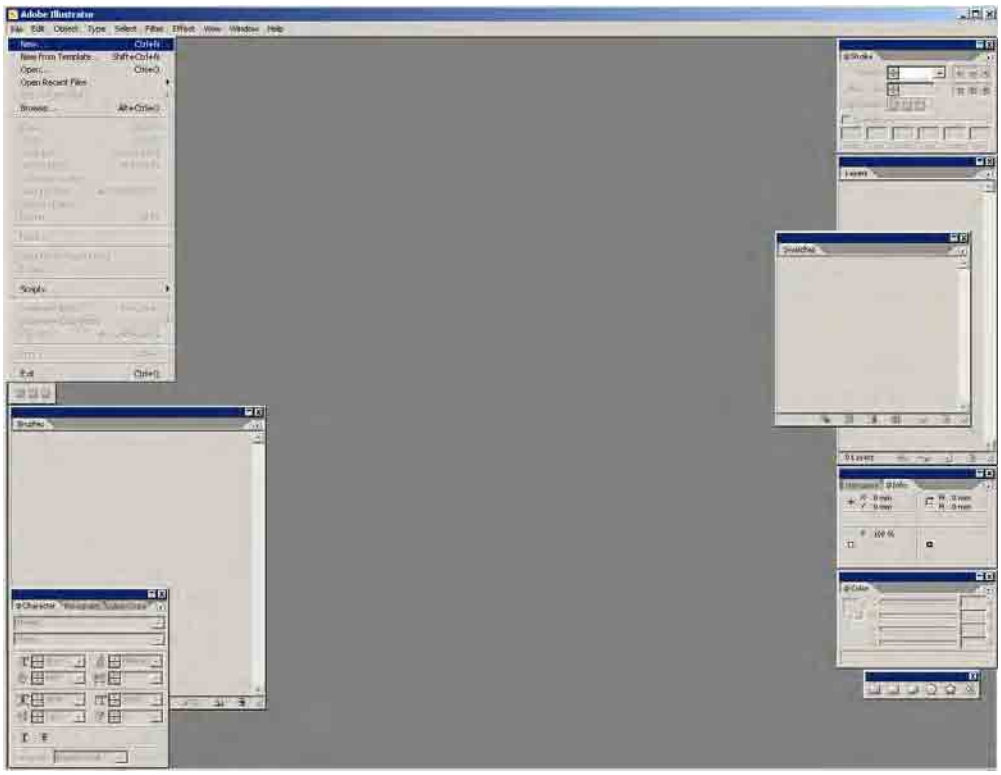
Once the definition has been successfully created and saved in the "***LocalCoordSysDef.fme***"and "***Coordsys.db***" files, restart Illustrator to access the new definition as a selectable choice in the coordinate systems dropdown list.

8. Importing Map Data Using Advance Import

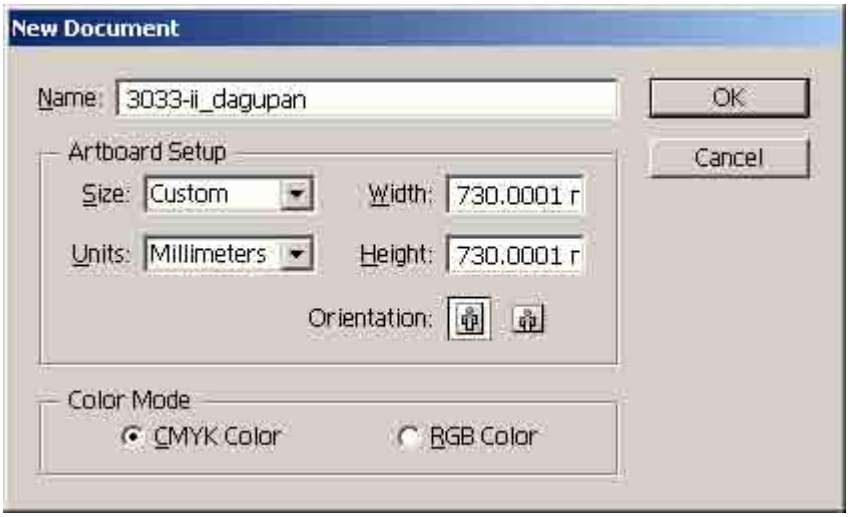
Advance Import provides an alternative method of importing map data into Adobe Illustrator. Its focus is for the mapmaker who has a collection of map data, that they wish to import into Adobe Illustrator at the same time. This function can deal with import of multiple formats and varying coordinate systems.

8.1 Open “Adobe Illustrator” (Desktop Icon or Program File Menu)

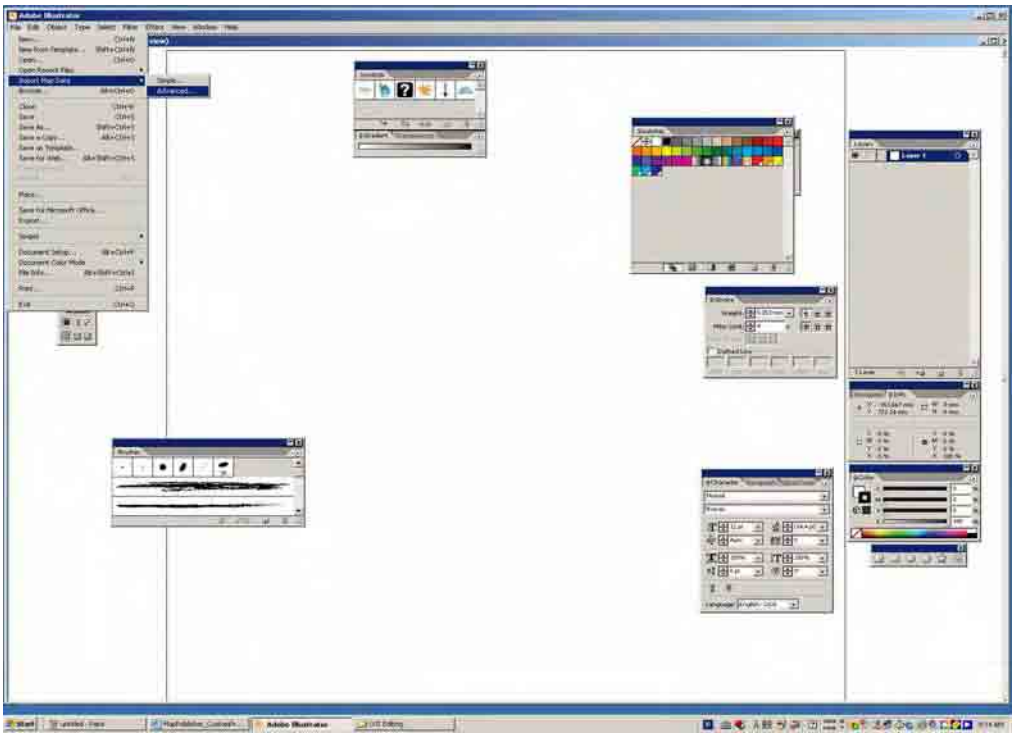
8.2 “Adobe Illustrator” will open. Click “File” and select “New”.



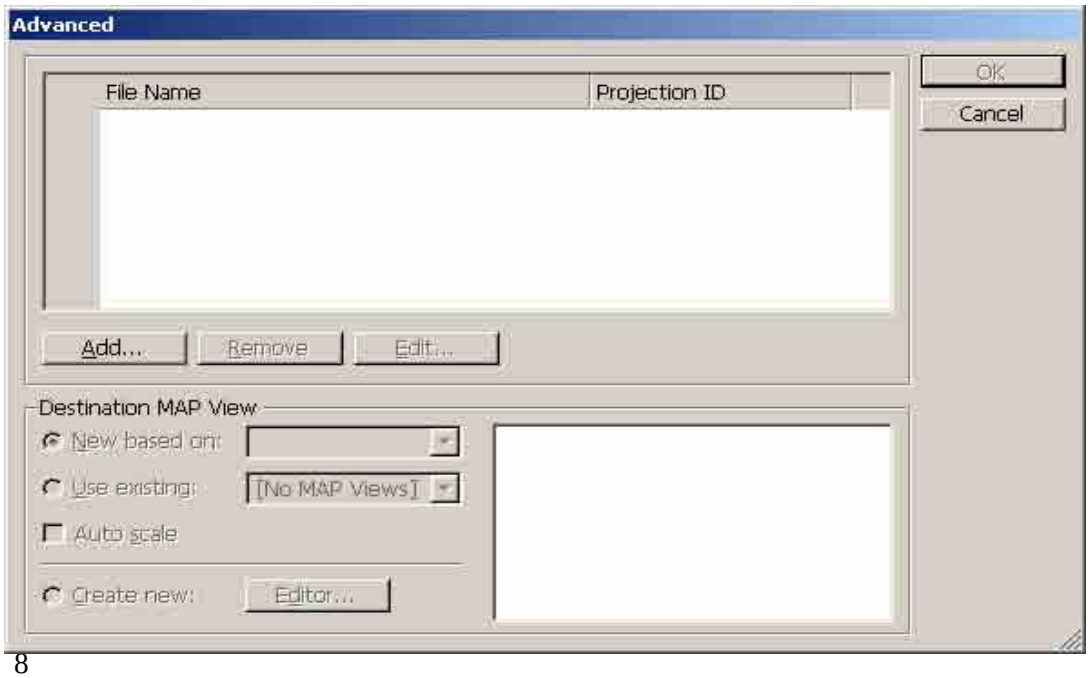
8.3 A “New Document” dialog box will open. Type the desired name (e.g. 3033-ii_dagupan) in the “Name” box. Select “Custom” in the “Size” box. Select the unit format (e.g. Millimeters) in the “Units” box. Type the desired Width (e.g. 730.000 and Height (e.g. 730.00) in the “Width” and “Height” box. Select the color mode (e.g. CMYK). Then click “OK”.



8.4 A new 8.4 A new document boundary limit will be created. Click “File”, select “Import Map Data” and click “Advanced”.

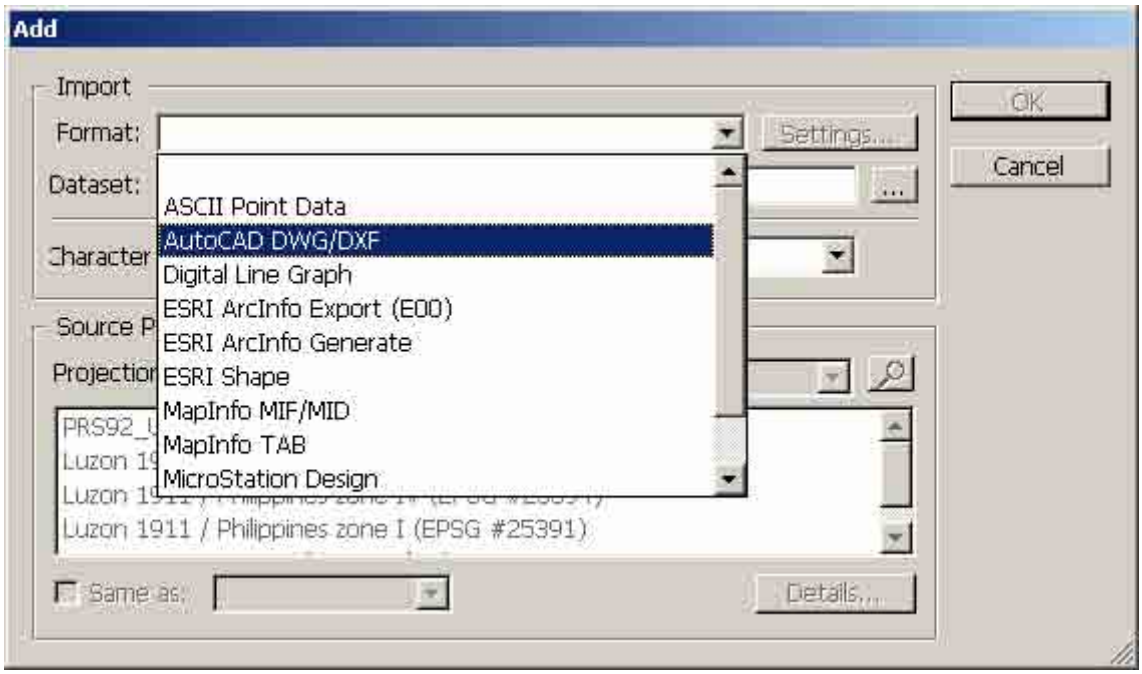


8.5 An “Advanced” dialog box will appear. Click “Add”.

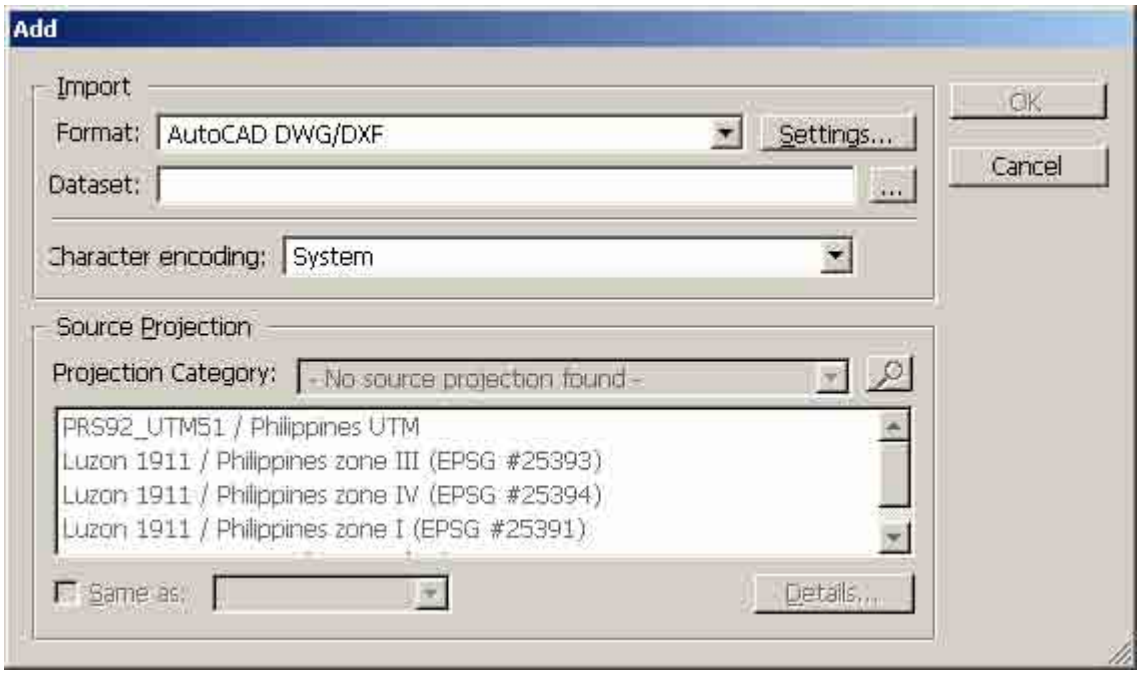


8

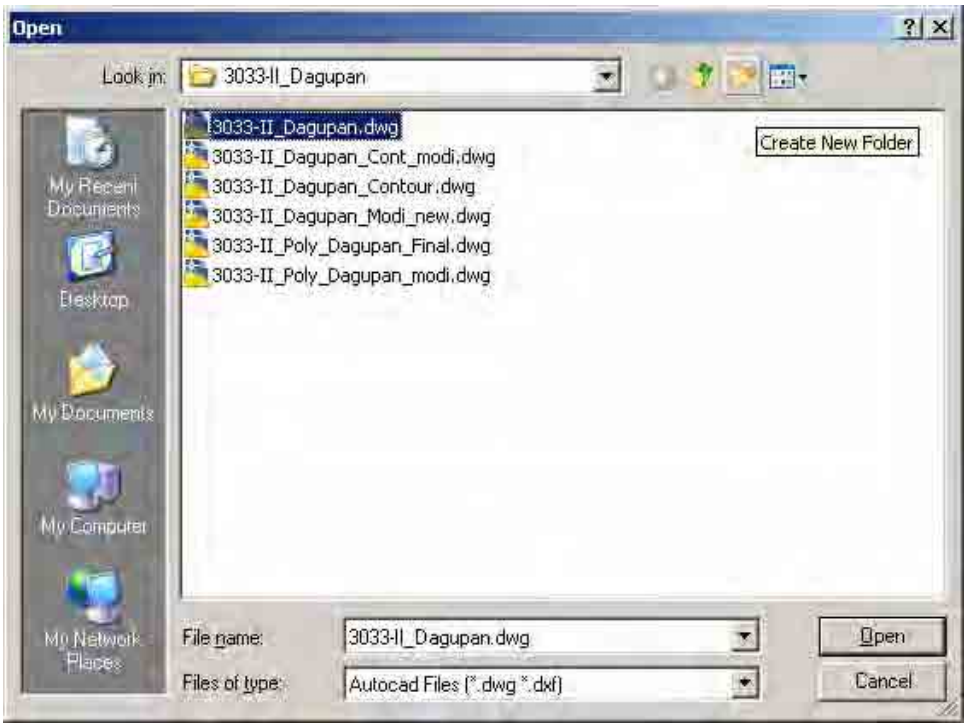
8.6 An “Add” dialog box will appear. Click down arrow in the “Format box and select the required format (e.g. AutoCAD DWG/DXF).



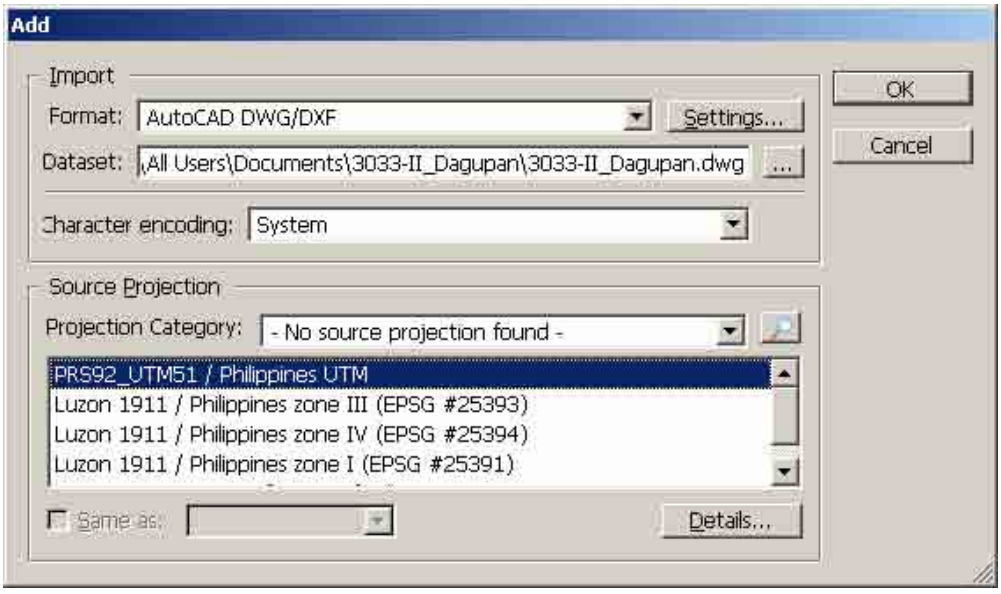
8.7 Click the browse button ... in the right side of the “Dataset” box.



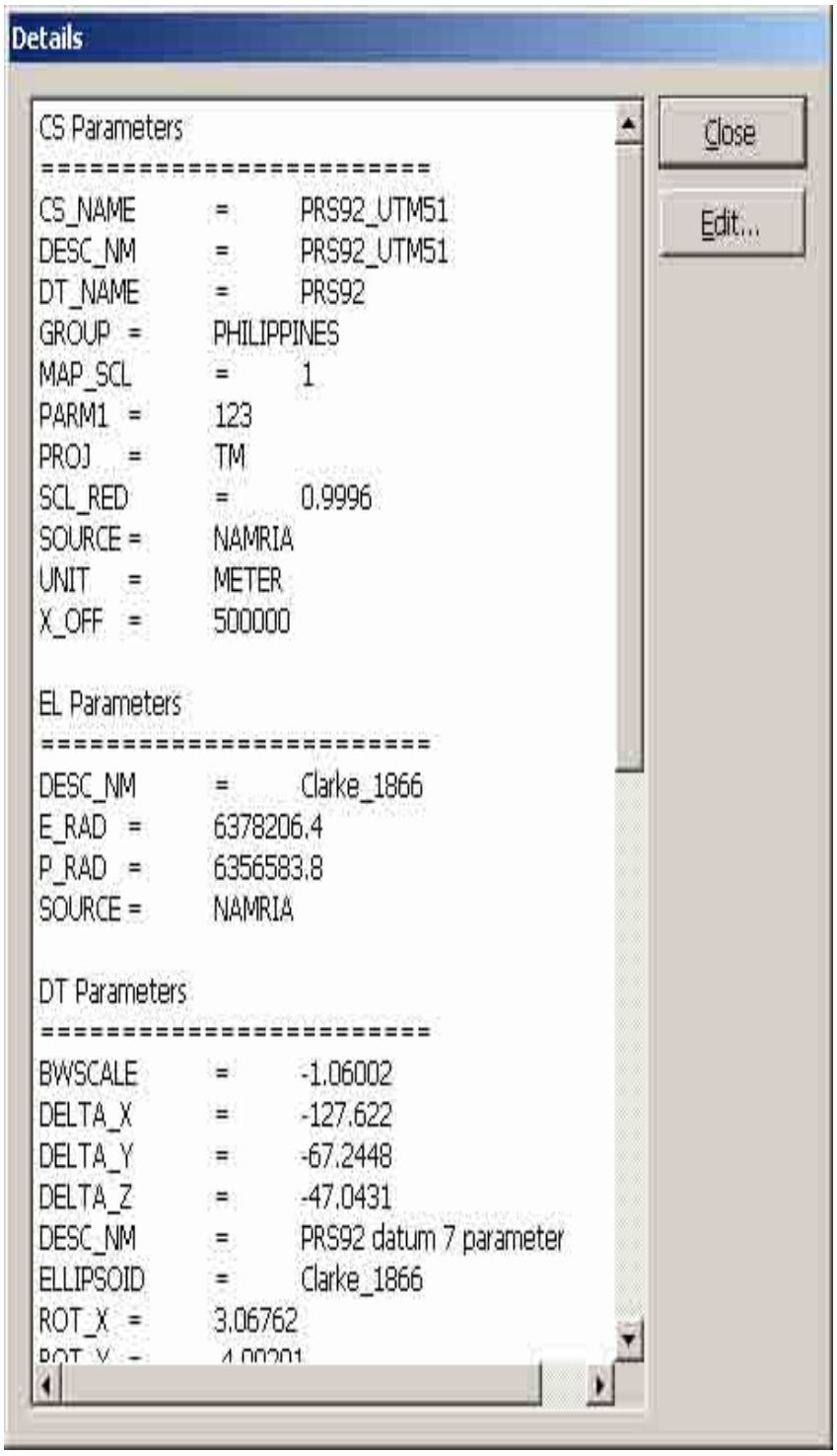
8.8 An “Open” dialog box will appear. Browse and locate the folder of the file to be opened. Select the file (e.g. 3033-II_Dagupan.dwg). Then click “Open”.



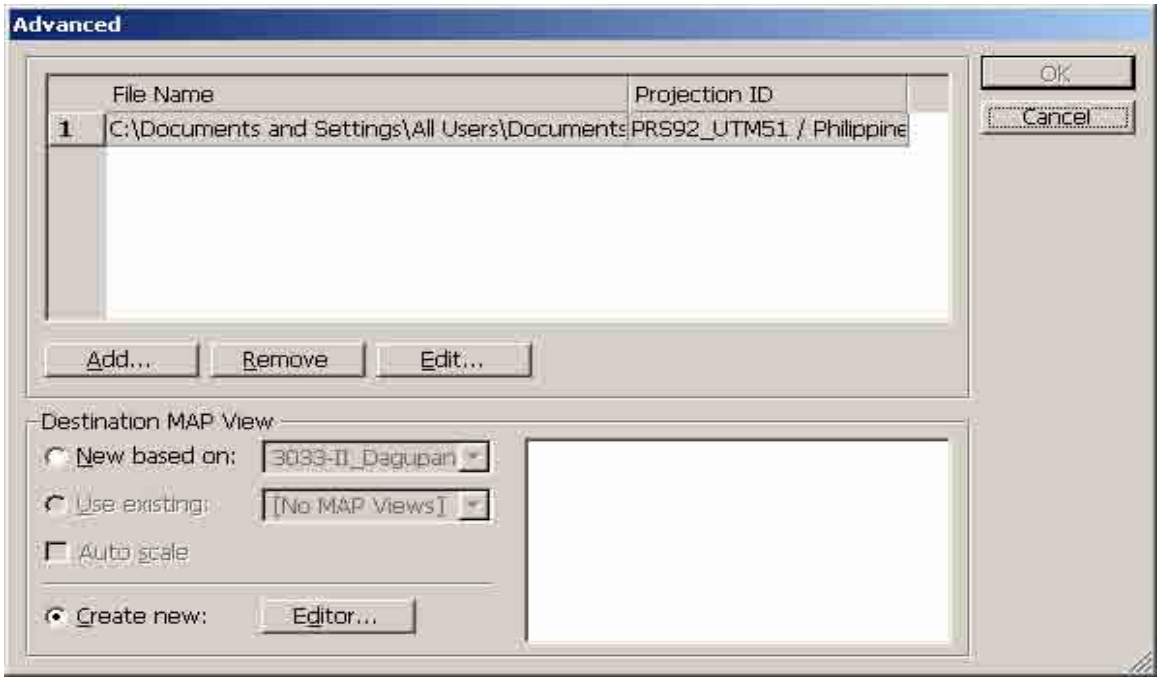
8.9 The selected file (e.g. 3033-II_Dagupan) including the path/directory will be reflected in the “Dataset” box. Select the required Projection (e.g. PRS92_UTM51/Philippines UTM) in the box below the “Projection Category”. Click “Details” in the lower right corner of the dialog box.



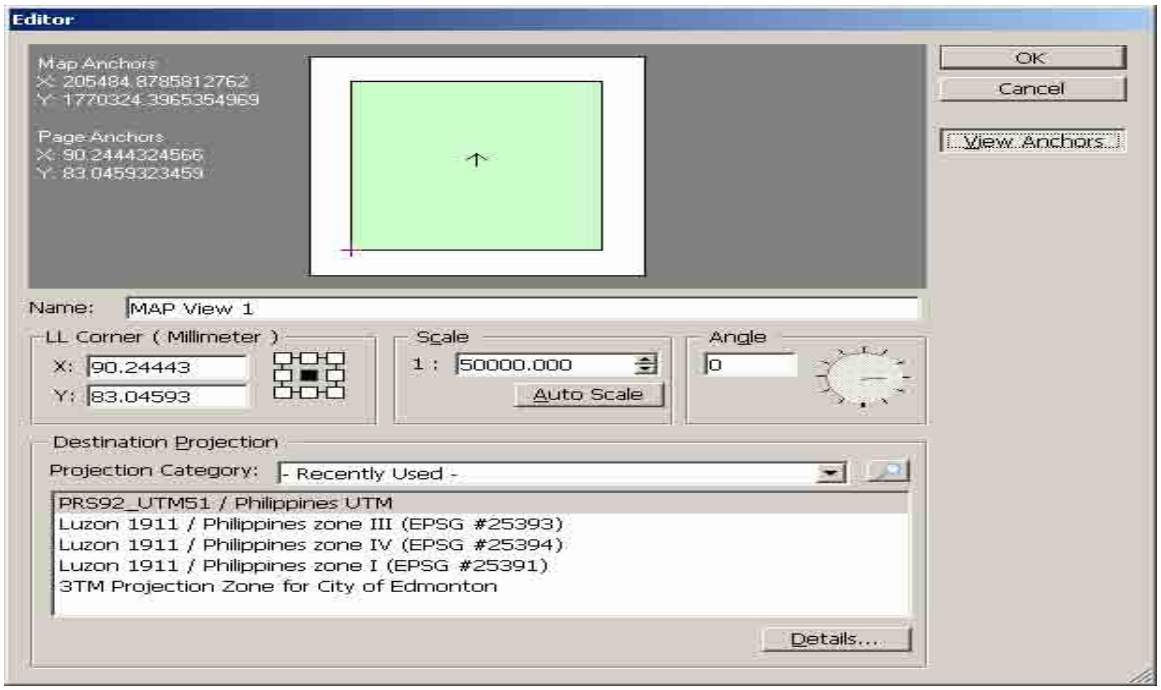
8.10 A “Details” dialog box will appear showing the information parameters of the projection selected. Click “Close”. Then click “OK” in the “Add” dialog box.



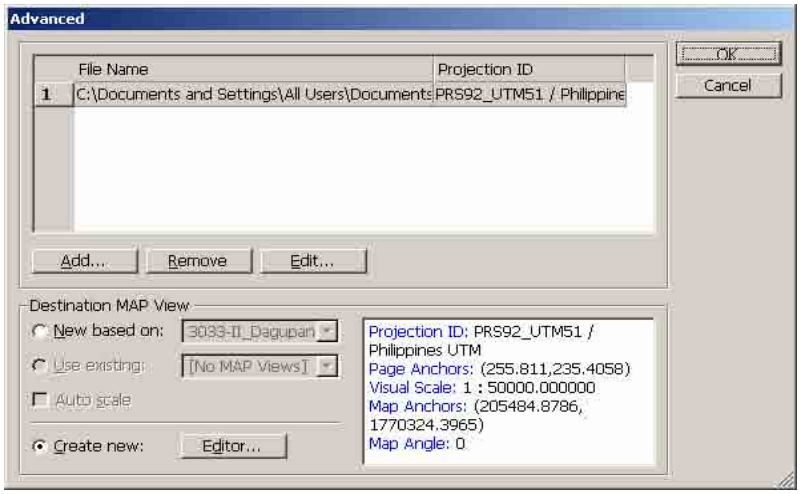
8.11 The Information of the dataset will be reflected in the “File Name and Projection ID” box. Click “Create new” and click the “Editor” button.



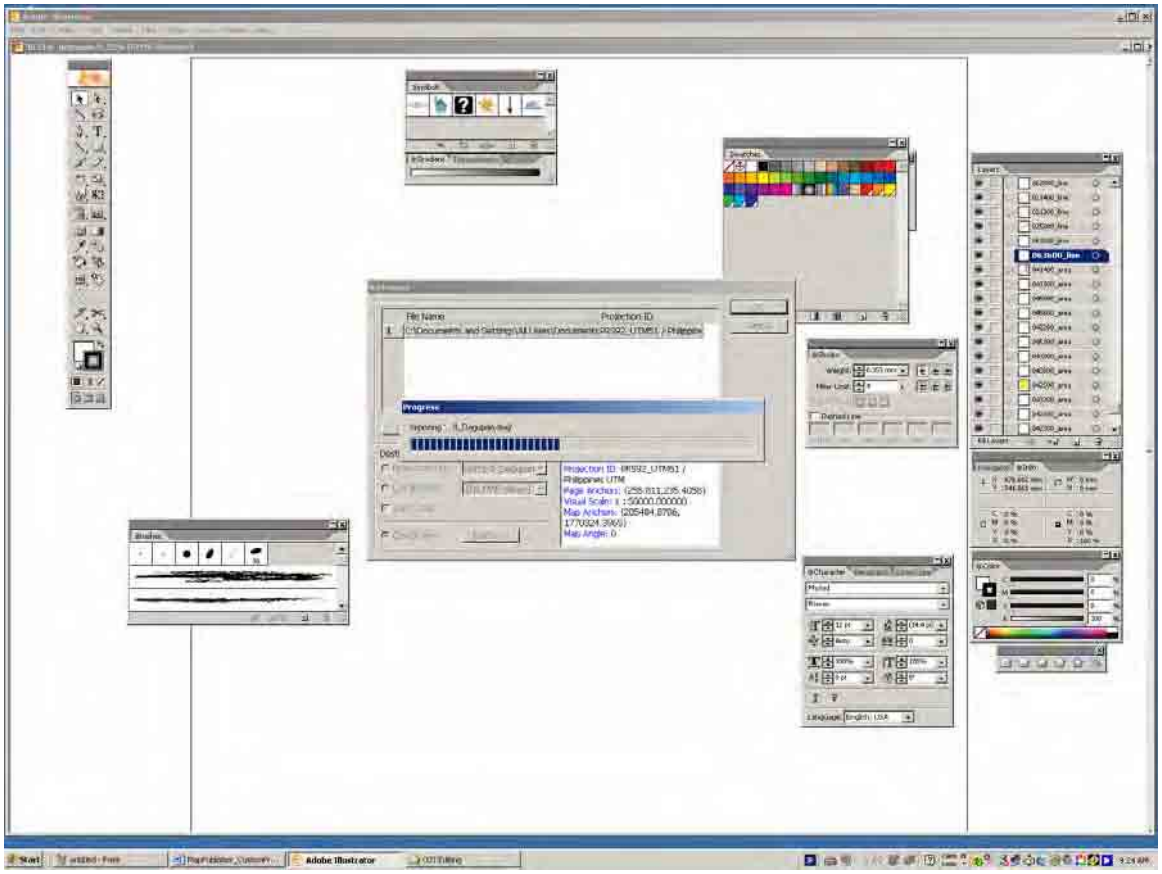
8.12 An “Editor” dialog box will appear. Type the required scale (e.g. 50000) in the “Scale” box. Set the page anchor by selecting the middle square. Click the “View Anchors” button to view the Map Anchor and Page Anchor information. Then click “OK”.



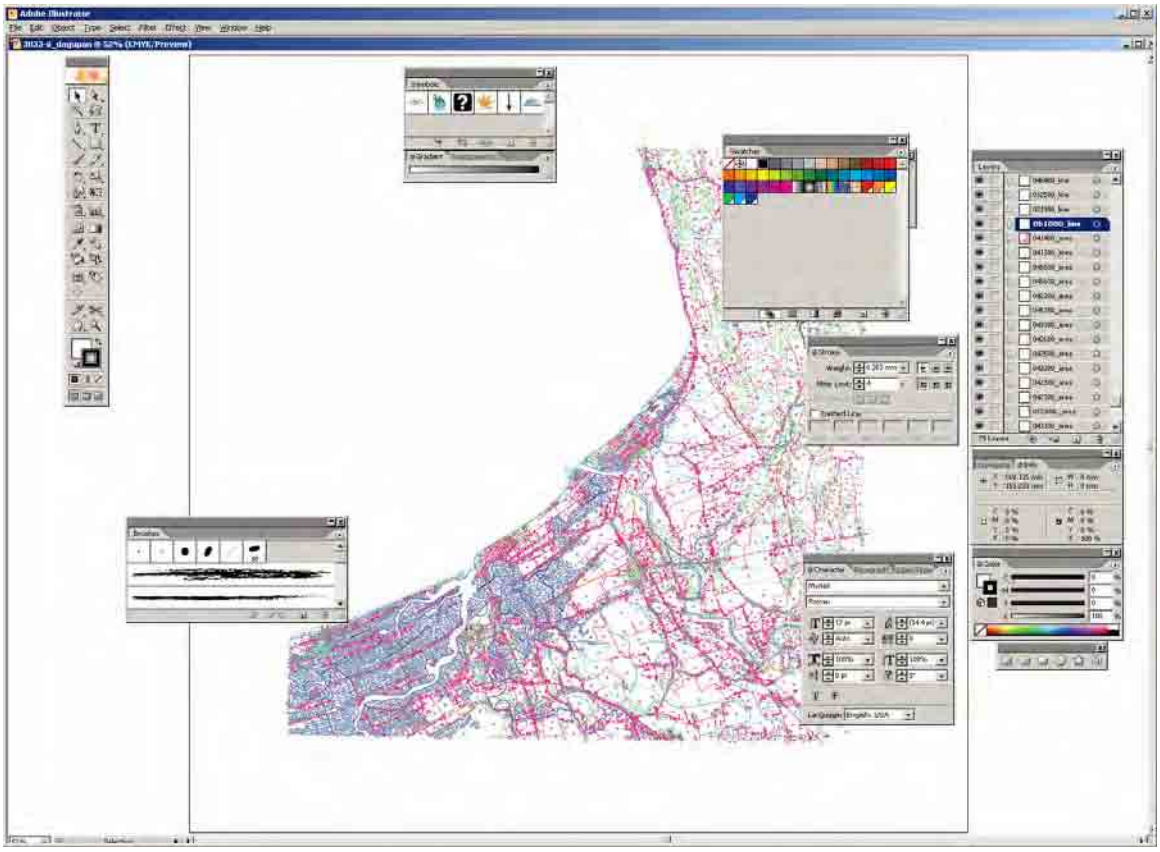
8.13 Additional information will be reflected in the “Advanced” dialog box. Click “OK”.



8.14 Wait for few minutes until the application process/load the data.

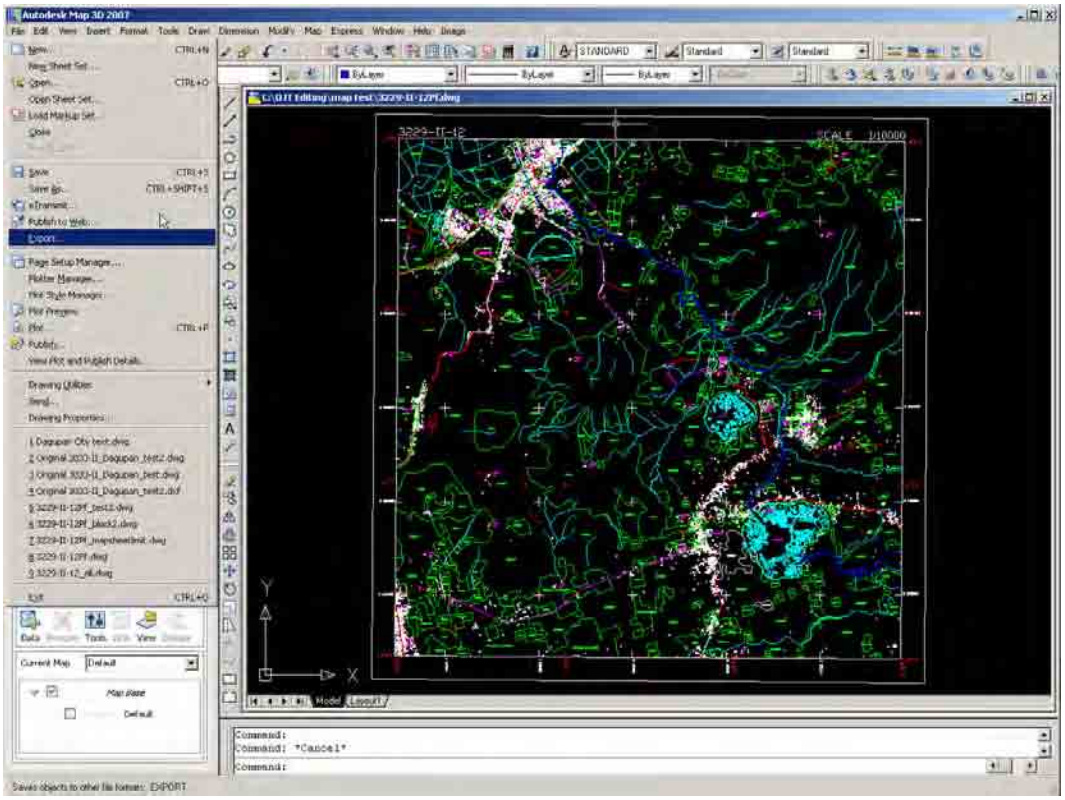


8.15 After processing, the data will be shown ready for cartographic enhancement / symbolization.

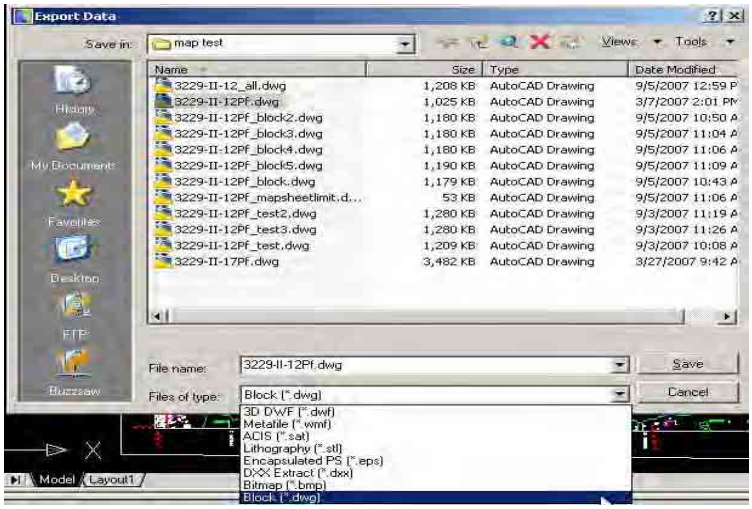


9. Exporting DWG file to BLOCK (If dwg/dxf file cannot be imported using MapPublisher)

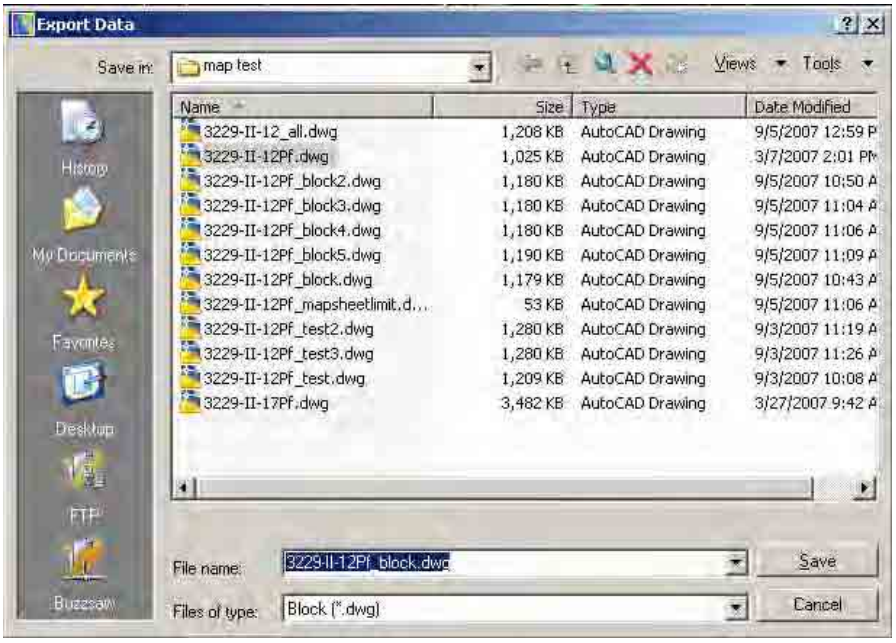
9.1 Open DWG file (e.g. 3229-II-12) in AutoCad. Click “File”, select “Export”.



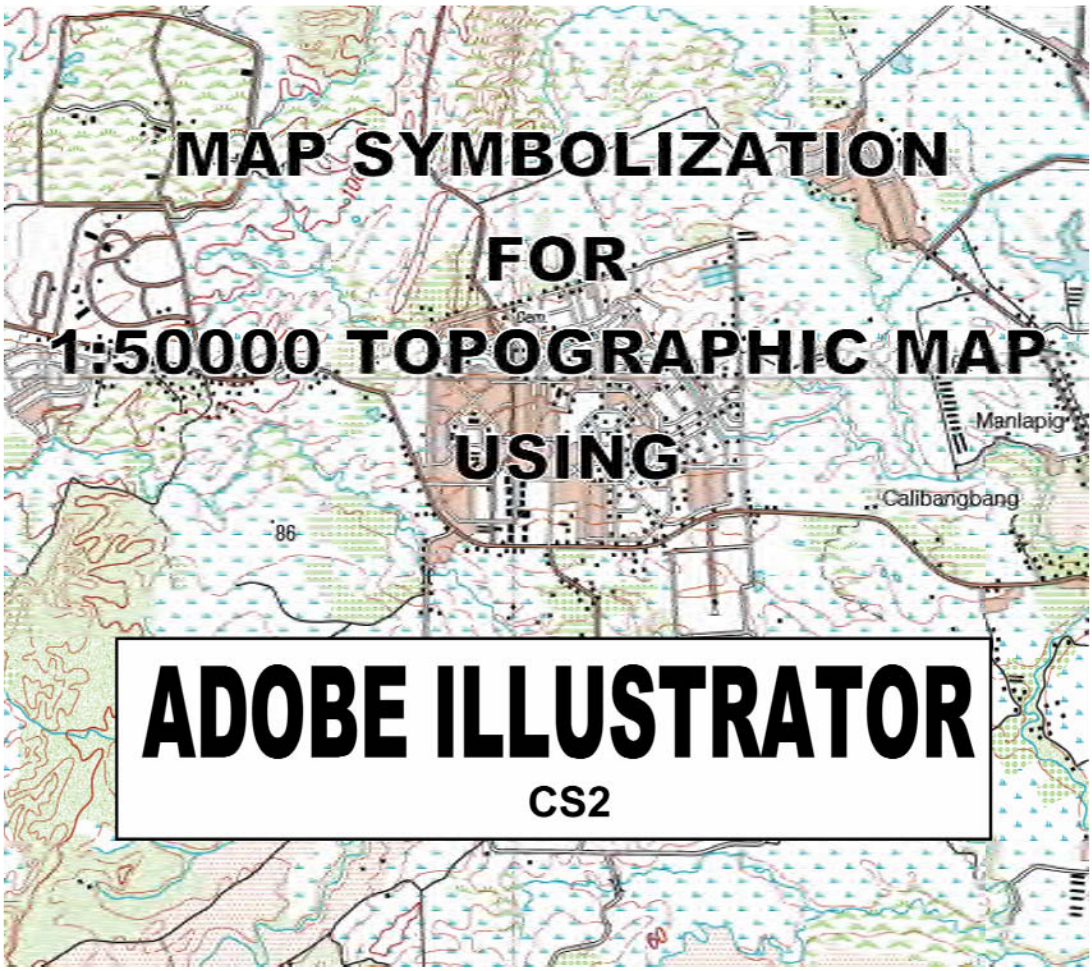
9.2 An “Export Data” dialog box will appear. Click down arrow beside the “Files of type” box and select “Block [*.dwg]”.



9.3 Type the file name (e.g. 3229-II-12Pf_block.dwg) in the “File Name” box. Then click “Save”.



THE STUDY ON MAPPING POLICY AND TOPOGRAPHIC MAPPING FOR THE INTEGRATED NATIONAL DEVELOPMENT PLAN OF THE PHILIPPINES



EDITION 1

Table Of Contents

1. Introduction

Depending on the nature of the work requests processes by the cartographic division, graphic design software and expertise may be required. It may be necessary for each cartographer to have specific training and access to a graphic design product such as Adobe Illustrator. With uncertain workloads it would be appropriate to have one cartographer that is familiar with Adobe Illustrator and direct this type of work to that person.

As with the other steps in the map production process it is important that output standards be in place. The standards would cover such items as font types and sizes, symbology and color selection.

Adobe Illustrator as a graphic design software combine with MAPublisher has the capability to update portions of a layer or legend by selecting one or more individual map objects based on attribute (MAPublisher) or color/pattern/symbol (Adobe Illustrator) and then reapplying a new color/symbol. No deleting and then re-adding of the relevant map elements/layers. In practical terms this means that if you just added a roads layer/element to your map and then realized that one of your road line symbols didn't look right, all you would have to do is select for that class of road symbol and change it. No need to delete, recode and redrape your roads. Even easier using the MAPublisher legend filters you need only modify the legend for your roads and "render" to update the roads as desired.

Redrawing of the affected map objects is automatic and impacts only on the redrawn portion and possibly some immediately affected portions of adjacent layers. No need to wait around while the entire map is re-drawn or refreshed. This applies to text as well as to vector data. Broad and flexible choice of text, fonts, styles, sizes and enhancement features (e.g. haloing). Enables PostScript pattern fills and complex vector strokes. You can sample colors from imagery and apply precisely to vector data. Even with complex colors you can easily and accurately create color ramps with differing depths/intensity. 10%, 20% etc. These can be set as individual colors on a palette or as a gradient across mapped feature(s). You easily turn on and off selected layers of a map to speed drawing. This can be done through either turning off specified layers or limiting the display of selected layers to simple vectors with all symbology removed. Not only will this speed the handling of the map, it lets you easily use underlying vectors for reference with no distraction or distortion caused by mapping symbology. Viewing "generalization" parameters can be set at any size so that your text or graphics will be automatically symbolized by grayed areas for layout (or any other) purposes. This facilitates design and layout and speeds the drawing of highly detailed maps. Symbology is accurately proportional to the map area you have "zoomed" into. What you see is what you get. Colors displayed on screen accurately reflect the colors as they will be printed. Again, what you see is what you get. Better symbology (e.g. road treatments and cartographic symbols) than traditional GIS software can currently offer.

In addition to standard zooming and panning capabilities, users have the option of viewing the details on a map at the actual size at which they will be plotted/printed. Users have the option of saving individual "views" to facilitate editing or viewing of defined portions of the map. No more searching around for a particular area that one wishes to display. Border rulers with adjustable guidelines and multi-combination alignment tools are available for use in aligning any map objects. There is an ungrouping as well as a grouping functionality. When grouped you still retain the option of separately accessing, querying and otherwise working with the individual components of a map group. Individual but related map objects can be "stored" together by groups or by layers or both within the graphic file. This provides additional control and support in handling and organizing the map components. When

copying or cutting/pasting map objects/elements, you have the option of deciding to paste the new object in "front" or "behind" the copied element(s) at the time of pasting.

2. Setting up the work area

2.1 To open a new file:

1 Choose File > New, and then enter a name in the Name text box.(see Image1)

2 Select the CMYK color mode

3 If necessary, specify a height and width for the artboard

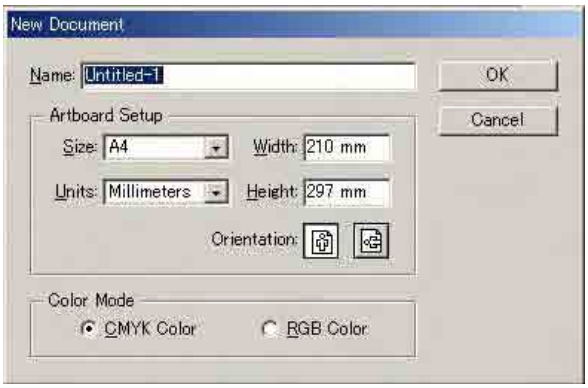


Image 1

2.2. To change the size of the Artboard:

1. Choose File > Document Setup. Then choose Artboard from the pop-up menu at the top left of the Document Setup dialog box. (see Image 2)
2. Do one of the following:
   Choose a preset size from the Size pop-up menu.

Choose Custom from the Size pop-up menu, and enter the dimensions you want in the text boxes, up to 227 inches by 227 inches. You can change the units in the document (and therefore of the artboard size) by choosing a different unit from the Edit > Preferences > Units & Undo dialog box

3. Click OK.

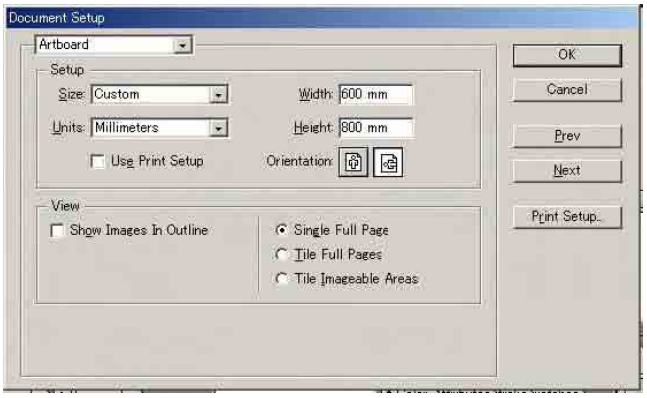


Image 2

3 Setting up map unit and working environment

3.1 General

Choose Edit > Preferences > General
In the Keyboard Increment text box, enter the distance you want each press of an arrow key to move a selection, and then click OK.

Check the Japanese Crop Marks. It is shown Japanese crop marks on the map.
(see Image 3)

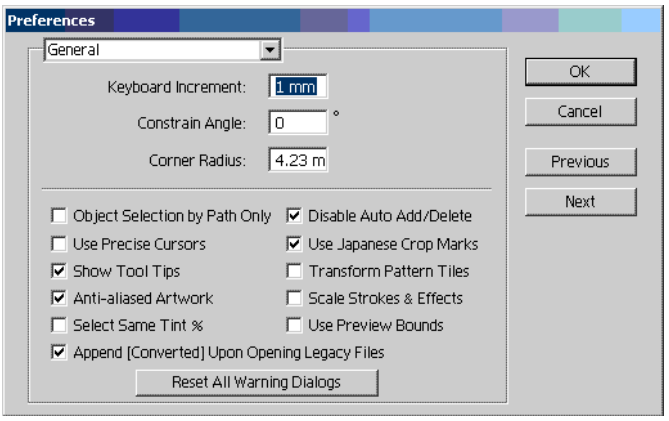


Image 3

3.2 Unit & Display Performance

Choose Edit > Preferences > Units & Display Performance.
Choose Millimeters from popup menu of General
Choose Millimeters from popup menu of Stroke
Choose Points from popup menu of Type
Display Performance suppose to modify if necessary.
(See Image 4)

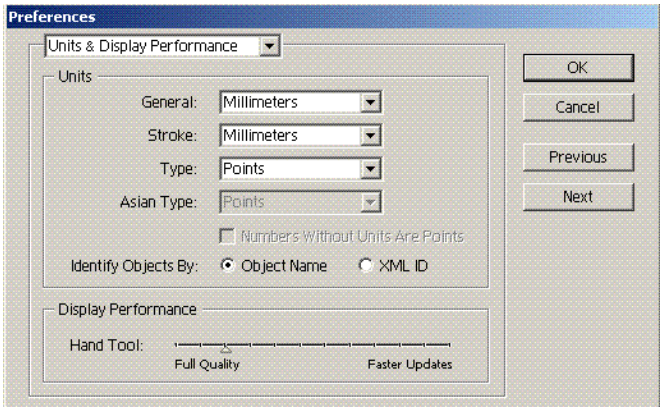


Image 4

3.3 Hyphenation options:

Choose Edit > Preferences > Hyphenation
If desired, choose the language in which the hyphenation rules apply (to English) from the Languages pop-up menu.
When you select a different language, the rules for hyphenating words change to match that language's rules.
(see Image 5)

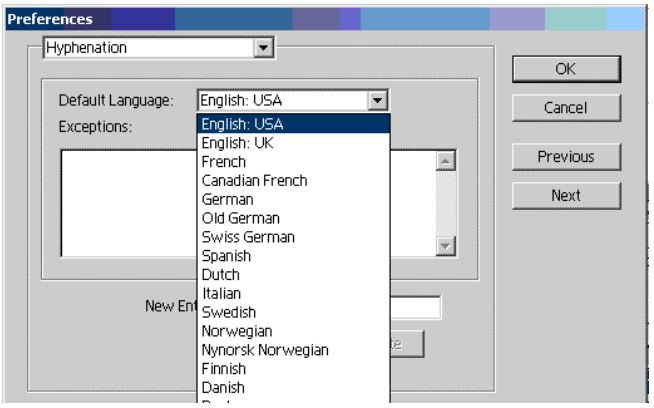


Image 5

3.4 Guide and Grid

Choose Edit > Preferences > Guides & Grid

Set options for guides and the grid:

For Color, choose a color for guides, or the grid, or both. If you choose Other, click the color box, choose a color from the color picker, and click OK.

For Style, choose a display option for guides, or the grid, or both.

For Gridline Every, enter a new value (and unit of measure if necessary) for the spacing of primary gridlines.

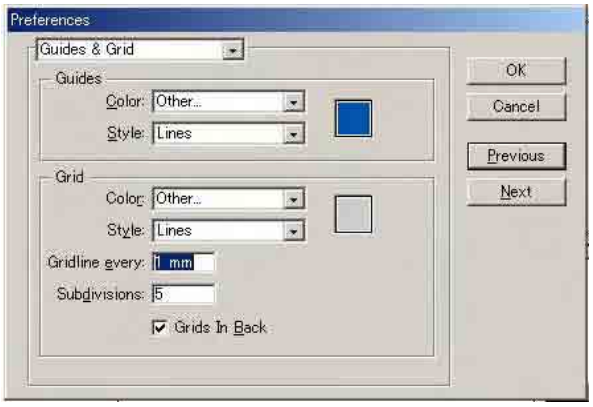


Image 6

For Subdivisions, enter a value to subdivide the grid.

For Grids in Back, select the option to display the grid behind all artwork; deselect the option to display the grid in front of all artwork.

Click OK.

4. Color management

It supposes to decide colors to use for offset printing. If it uses five colors as black, cyan, green, and brown, examples following:

4.1 Black ,White and Cyan

Choose Window > Color, The Color palette will be shown, then select CMYK from pull down.
C=0 M=0 Y=0 K=0% in case apply “white”, Set C=0 M=0 Y=0 K=100% For Black, Set C=100% M=0 Y=0 K=0% for Cyan.

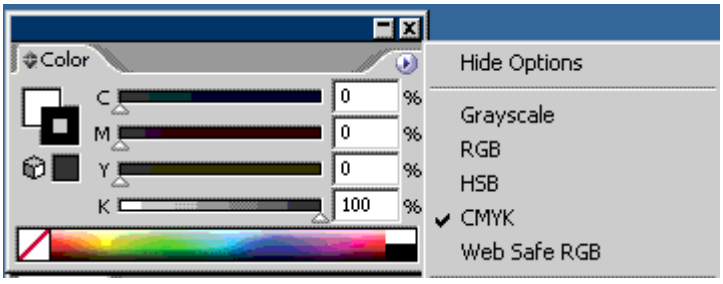


Image 7

4.2 Spot colors

Color of Green and Brown will be made as following:

Incase of Green:

1 Open Swatches palette: Choose window > Swatches. Click allow button at the top right of Swatches palette, and then choose New swatches (see Image 8)

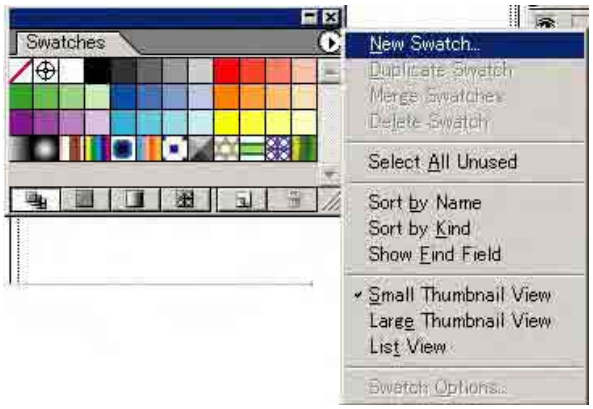


Image 8

2 Enter “green” in Swatch Name text box, Choose “Spot Color” from pop up menu of Color Type, Choose “CMYK” from pop up menu of Color Model. Then put number of % into text box as example C = 55, M = 0, Y = 85 and K = 0. Click OK. (see Image 9)

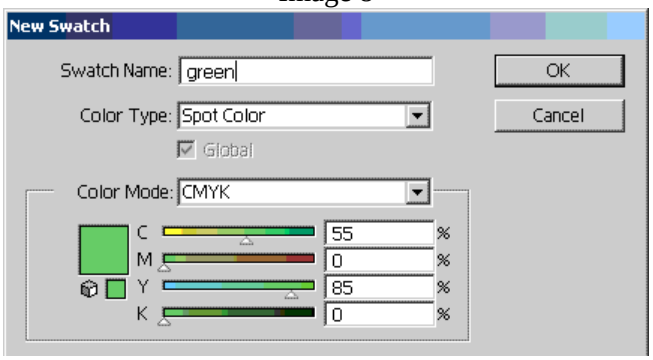


Image 9

5. Symbolizations

5.1 Line features

5.1.1 Simple line

(1) The simple line made by one color as index contour (layer 081200):

1 Apply line weight:

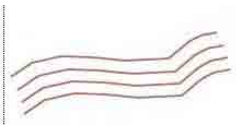
Select contour with any selection tool.

Show stroke: Choose window > Stroke.

Fill in 0.2mm in text box of Weight

Choose Cap and Join as image.

(see Image 10)



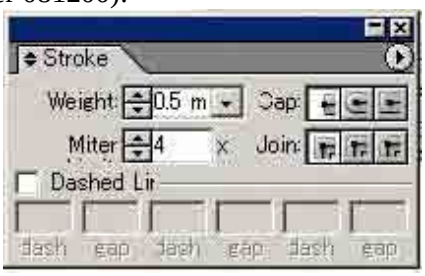


Image 10

2 Apply color:

Select contour with any selection tool.

Show color palette: Choose window > Color.

Choose fill  and click none  Choose stroke

(see Image 11)

Then choose Brown from Swatches palette (see Image 12)

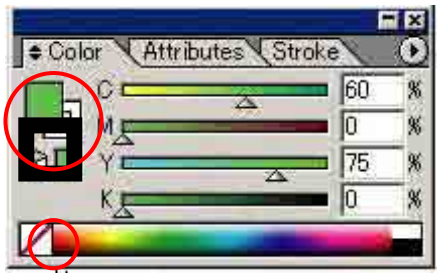


Image 11

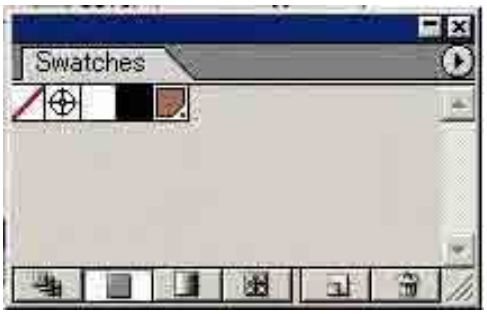


Image 12

(2) The line made by dash as Trail (layer 021800):

1 Applying line weights same as (Image13). Check Dashed line box. Enter distance of dash and gap as example dash 2.0mm, gap 0.5mm. (see Image 13)

2 Line Color should be applied with color palette as (1)

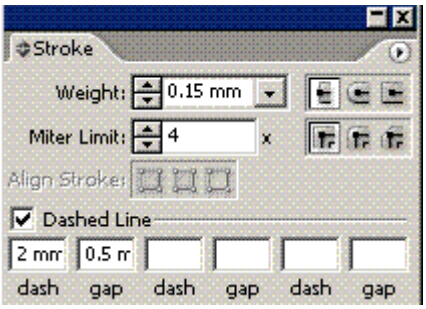


Image 13

(3) Normal or broad gauge ; double or multiple track (layer 023200)

1 Apply line weight 0.3mm into the dialog box.

2 Line Color should be applied black with color palette.

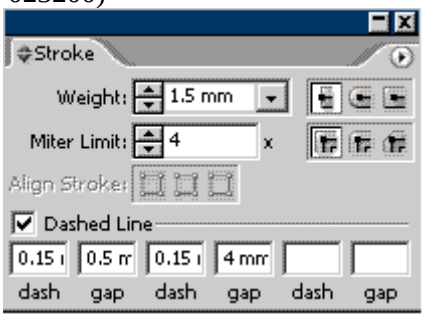
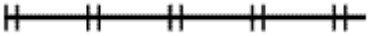


Image 14

Select above line and Copy : Choose Edit > past in front. Then apply line weight 1.5mm, Check Dashed line box. Enter distance of dash 0.15mm, gap 0.5mm, dash 0.15mm, gap 4mm. (see Image 14)



5.1.2 Lines made by multicolor

(1) Divided highway, with median strip. Hard surface, all weather (layer 021100)

1 Select a line with any selection tool. Then apply line weight 1.1mm, stroke color K 100% CMYK color model. (see Image 15)

(Layer 021100)

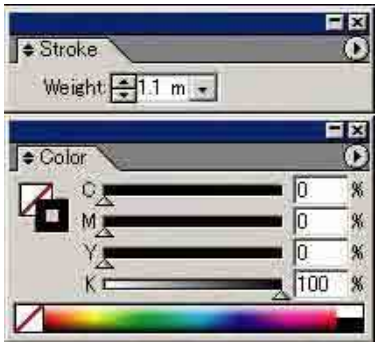


Image 15

2 Modify layer name: Double click layer or select layer, and then click the button at top right of layers box, then choose “Option for….”.
Layer Options box appears. Enter new name 021100 in the text box. Click OK (see Image 16)

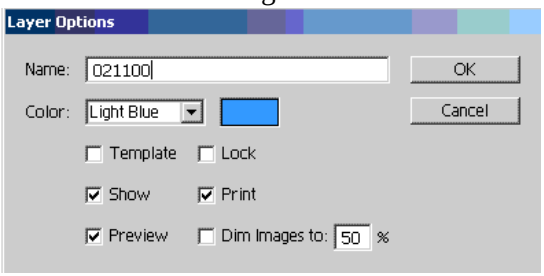


Image 16

3 Duplicate layer of 021100: Select layer 021100, and then click the button at top right of layers box, then choose “Duplicate 021100”. Layer options box appears. And then enter new layer name 021100f in the text.

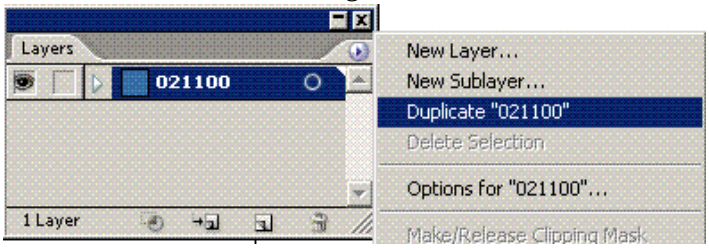
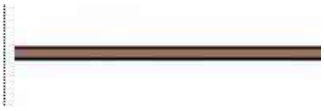


Image 17

4 Applying line weight and stroke color for layer 021100f: Select the objects of 021100f with any selection tool
Enter 0.6mm in the text box of weight, apply stroke color Brown 40%. Layer 021100f should be upper than layer 021100. (see Image 18)



*you can select all objects at once if many objects inside of same layer: Choose > select > All)

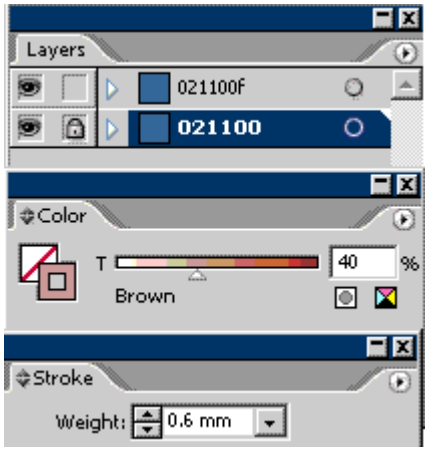


Image 18

5 Duplicate layer of 021100f: Same method as above method "3"

6 Applying line weight and stroke color for layer 021100c: Same method as above method "4"
Line weight 0.1mm, Stroke color K 100%
(see Image 19)

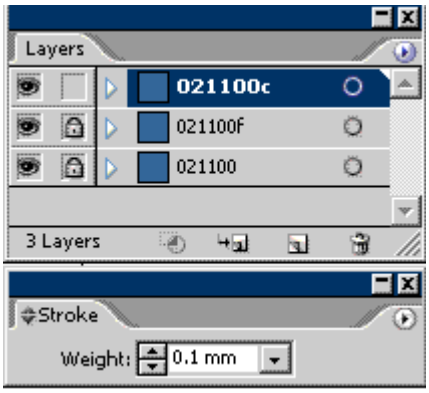


Image 19

5.1.3 Lines made by offset line

Minimum symbol of Cut (layer 082400):

1 Select top line of Cut to use any selection tool. Apply line weight 0.15mm and stroke color Brown 100


Image 20

2 Select top line of Cut to use any selection tool. Choose Object > Path > Offset Path. Offset Path dialog box appears as Image 20. enter offset distance 0.4mm (half of tick length) in the Offset text box. Choose "Bevel" from Joins pop up menu. Click OK. Object shown as Image 21.

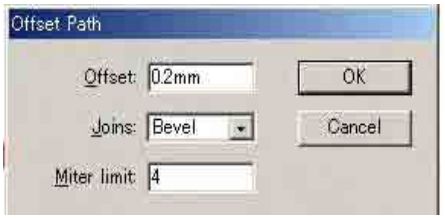


Image 20


Image 21

3 Cut above line made by offset path to use Scissors tool. Then delete one line you don't need as Image 22.

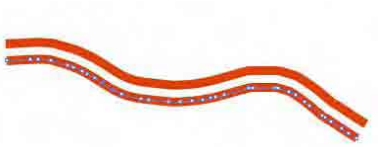


Image 22

4 Select the line remained with above method. Apply line weight 0.4mm(tick length). Enter each distance in the dash and gap text box. (dash 0.15mm, gap 0.6mm)

Image 23

5.2 Point features

5.2.1 Simple symbols

(1) Building (layer 041400)

1 Select Rectangle tool. Click any place you need to draw on the document. Enter 0.5mm in the Width text box and Height text box. Click OK. (see Image 24) Then apply fill color K 100.

Image 24

(2) Triangular control point (layer 090100)

1 Select polygon tool.

2 Click any place you need to draw on the document. Enter 0.866(Calc:1.5/2/30cos=) mm in the Radius text box and put 3 in sides box. Click OK. (see Image 25) Then apply stroke color K 100, fill none, line weight 0.1mm.

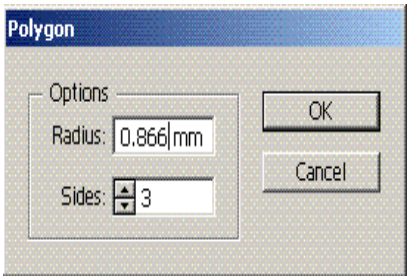
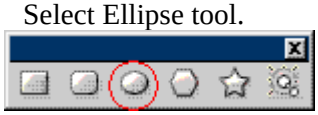


Image 25

3 Select Ellipse tool.



4 Click any place you need to draw on the document. Enter 0.2 mm in both of the Width and Height text box. Click OK. (see Image 26) Then apply stroke none, fill k100, line weight 0.2mm.

5 Then put 0.2mm ellipse on center of triangle.

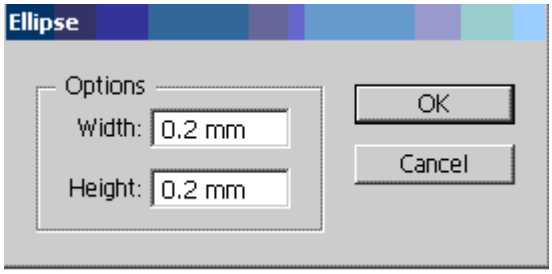


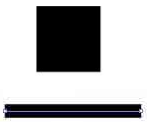
Image 26

5.2.2 Symbols made in combination with simple figures

(1) Church (layer 043200)

1 Draw the square 0.7mm x 0.7mm.(see 2.1.(1).1, Image 27). Apply fill color K 100.

2 Draw the line 1mm in length to use Line segment tool (see 1.4.2, Image 25). Apply line weight 0.1mm, stroke color K 100.



3 Select the line to use selection tool. Choose Object > Transform > Rotate or double click Rotate tool. And then enter 90 in the Angle text box. Click Copy (see Image 27).

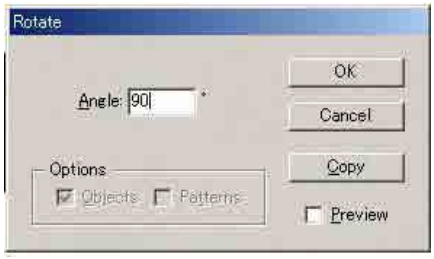
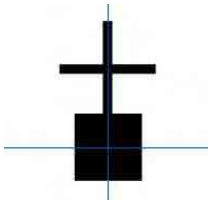


Image 27

4 Fix the cross and the square. If you need guide line for fixing: Choose > View > Show Ruler. Drag mouse from Ruler bar to position you need to draw guide line (see Image 28). Finally apply group all of object.



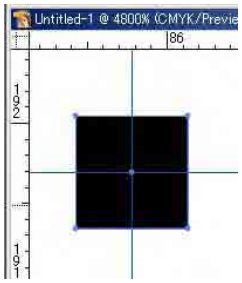


Image 28

(2) School (layer 042200)

1 Draw the square 0.7mm x 0.7mm.(see 2.1.(1).1, Image 27). Apply fill color K 100.

2 Draw the triangle to use polygon tool: Select Polygon Tool. Then click any place you need to draw on the document. Enter 0.47mm in the radius text box. Select 3 from Sides pop up menu.(see Image 29). Apply fill color K 100 (Fig.2.2.2.1)

Image 29

3 Select the triangle. Then choose Object > Transform > Scale or double click Scale tool, and then check Non-uniform and enter 61,4% in the Horizontal text box, 100% in the Vertical text box. Click OK (see Image 30) (show Fig.2.2.2.2)

4 Select above object. Choose Object > Transform > Rotate or double click Rotate tool. Enter -90 in the Angle text box. Click OK (see Image 31) (show Fig 2.2.2.3)

5 Draw vertical line 1mm in length to use line

segment tool. Apply line weight 0.1mm, stroke color K 100.

6 Fix drawn square, triangle and line.(show Fig 2.2.2.4) finally group all of object.

Image 30

Image 31

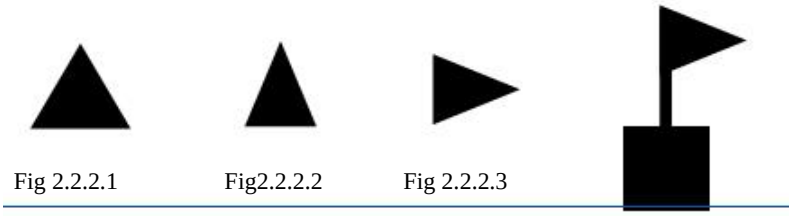


Fig 2.2.2.1 Fig2.2.2.2 Fig 2.2.2.3

Fig 2.2.2.4

(3) Lighthouse (layer 050300)

1 Select Star tool. Click any place you need to draw the star on the document.

2 Enter 0.325 mm in the Radius 1 text box. Also enter 1.1 mm in the Radius 2 text box. Select 6 from Points pop up menu. Then Clock OK(see Image 32). Apply fill color K 100. (show Fig 2.2.3.1)

3 Rotate above star 30 degree.(see 2.2.(2).4) (Show Fig 2.2.3.2)

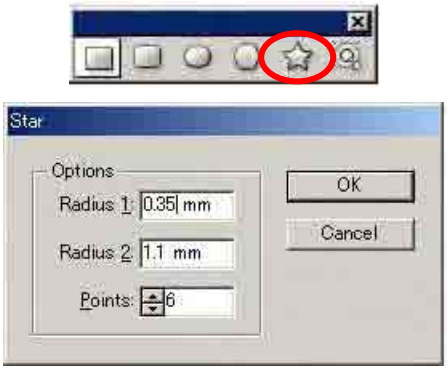


Image 32

4 Draw the round shape 0.65mm in diameter to use ellipse tool. Then apply fill color CMYK 0. and then put on center of the star.(Show Fig 2.2.3.3). If the round shape not shown in front of star, you can do this method: Select the star. Choose Object > Arrange > Bring to front.

5 Draw the round shape 0.1mm in diameter to use ellipse tool. Then apply fill color K 100. and then put on center of the above object .(Show Fig 2.2.3.4).

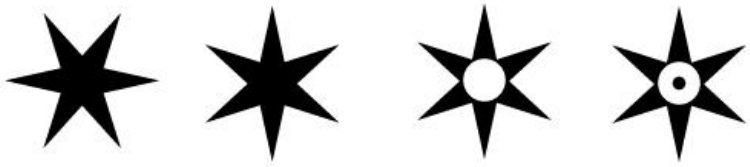


Fig2.2.3.1 Fig2.2.3.2 Fig2.2.3.3 Fig2.2.3.4

5.2.3 Intricate Symbols

(1) (Port 026000)

1 Draw the circle 2.5mm in diameter to use ellipse tool. Apply Stroke color K 100. Apply line weight 0.15mm (Show Fig.2.3.1.1)

2 Cut circle above on half with the Scissors tool. as Fig.2.3.1.2

3 Select Half circle above and. Then select effect from menu bar , select > stylize > add arrowhead. Click Left arrow head for Star, Click right arrowhead for End. Set 40 % in Scale box.
(see Image 33) arrowhead shown as Fig. 2.3.1.3

4 Draw 2 lines with line Segment tool
1: 2.5mm in length 90 degree, 0.15mm stroke.
2: 0.5mm in length 0 180 degree, 0.15 stroke
Draw 0.5mm diameter a circle with 0.15 mm stroke.
See Fig 2.3.1.4

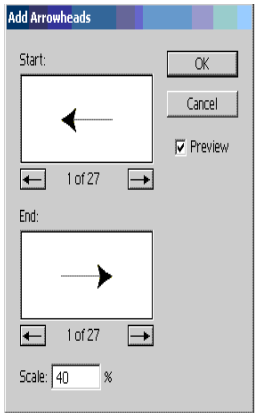


Image 33


Fig.2.3.1.1 Fig.2.3.1.2 Fig.2.3.1.3 Fig.2.3.1.4 Fig 2.3.1.5

Image 34

5 Then select 3 objects above. Then Click Horizontal align center. (See Image 34). Then fix to half circle. Fig 2.3.1.5

(2) Windmill (layer 050100)

1 Draw the line 1.25mm in length, 45 degree with line Segment tool stroke 0.15mm color k100 Fig.2.3.2.1.

2 Select the object above and rotate with rotate pallete. Put 90 degree in text box, then click **Copy.** (see Image 35) The object shown as Fig.2.3.2.2.

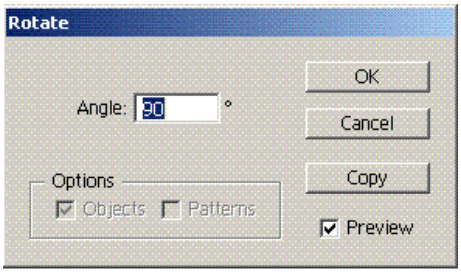


Image 35


Fig.2.3.2.1 Fig.2.3.2.2 Fig.2.3.2.3 Fig.2.3.2.4 Fig.2.3.2.5 Fig.2.2.2.6

3 Draw an anchor point with Pen tool. Then select that point and move with Move palette input 1mm in horizontal text box, then click Copy. 2 anchor points shown. Select First anchor point you drew, then move with move palette, input 0.5mm in the horizontal box and 1.8mm in the Vertical box, then click copy. (see Image 36), 3 anchor points shown.

4 Select both of top anchor point and left bottom point at once. Then do Object > Path > Join (Ctrl+j), Object shown as Fig.2.3.2.3. To redo same process for top point and right bottom point. The object shown as Fig.2.3.2.4.

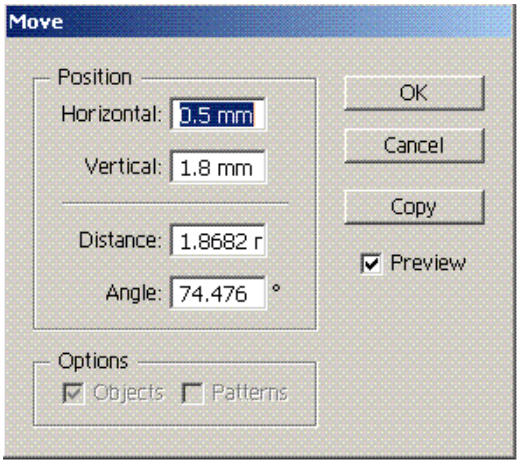


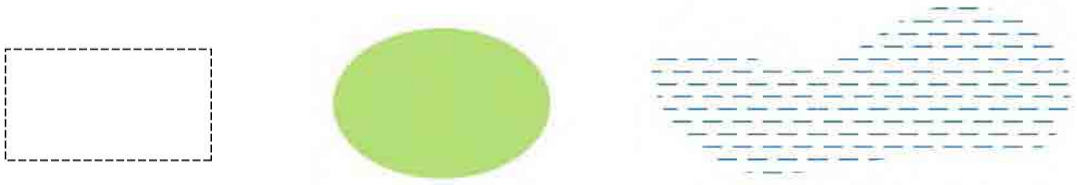
Image 36

5 Draw the line 1.7mm in length, 180 degree with line Segment tool stroke 0.15mm color k100.
Then select 3 objects Fig.2.3.2.2., 2.3.2.4 and 2.3.2.5. Then fix each objects.

5.3 Polygon feature

5.3.1 Simple polygon

1 Draw any polygon to use any tool. Then you can apply line color, fill color, line weight, and line type. If you need to apply pattern for fill: Choose Window > Swatches. Then choose any pattern from pattern Palette.



Polygon to use dash line Polygon fill with green Polygon fill with pattern

2 You can exclude donut polygon if necessary: Select both of polygons, then exclude with Pathfinder (see Image 37) or Choose Object > Compound Path > Make.

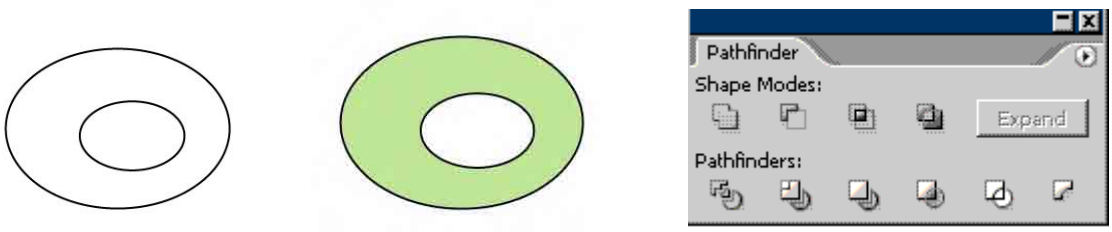
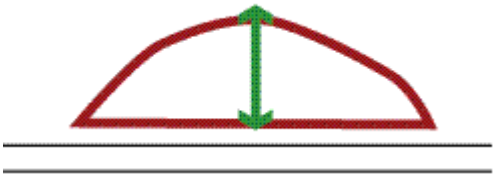


Image 37

5.3.2 Intricate polygon

Actual size of Cut (layer 82400):

1 Duplicate layer. And lock one layer. Then Measure between top of cut and road(bottom of cut) to use measure tool. The distance shown in Info dialog box.(see Image 28)



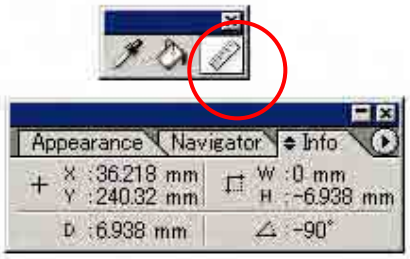


Image 38

2 Draw the tick line in the length longer than you measured: Select Line Segment Tool, Click any place you need to draw on artboard. Then enter length longer than you measured in the Length text box.(see Image 39). You can set line angle if necessary. (Horizontal line 0, Vertical line 90). And then apply line weight 0.15mm stroke color brown 100. Then fix the line on cut as below.

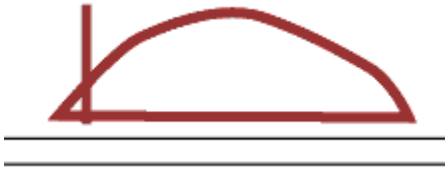
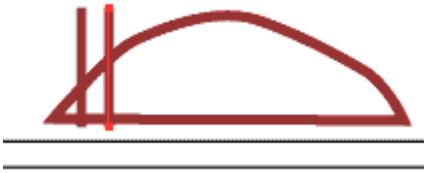


Image 39

3 Select the tick to use any selection tool. And select Transform > move. Enter distance of ticks space (0.6mm) in the horizontal or vertical text box if it necessary (see Image 40) Click Copy.



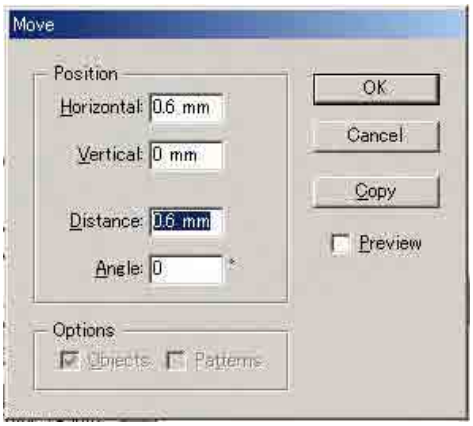
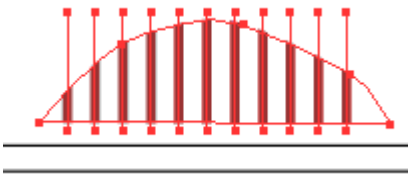


Image 40

4 Repeat above method for filling cut with ticks. Use shortcut key to repeat: Choose edit > Copy (Ctrl + C), choose edit > Paste in Front (Ctrl + F), choose object > Transform > move (Ctrl + D)

5 Now, you need to edit length of ticks. Select one Cut polygon and replace stroke color. Then Object > Arrange > Bring to front. Then select all ticks and polygon. Then Object > Clipping mask > make. Ticks masked by polygon.



6 Now Duplicated layer turn on preview and edit: Delete Cut lower side line with scissor

tool. Then Upper line only shown.

3 LAYER 061400 Large Reef

a. Prepare pattern: Draw part of symbols as Fig.5.3.4.1. Make bounding box with fix size symbols be inside. Then define pattern.

Fig5.3.4.1

Fig5.3.4.2

b. Make pattern brush (V.1) (see Image 43) : then select pattern brush, and put name of brush and apply pattern which you made by step “a” Click OK.(see Image 41)

c. On Pattern brush options dialog box, put name and apply side pattern from the list. Pattern name you made above shown in the list. (see Image 42)

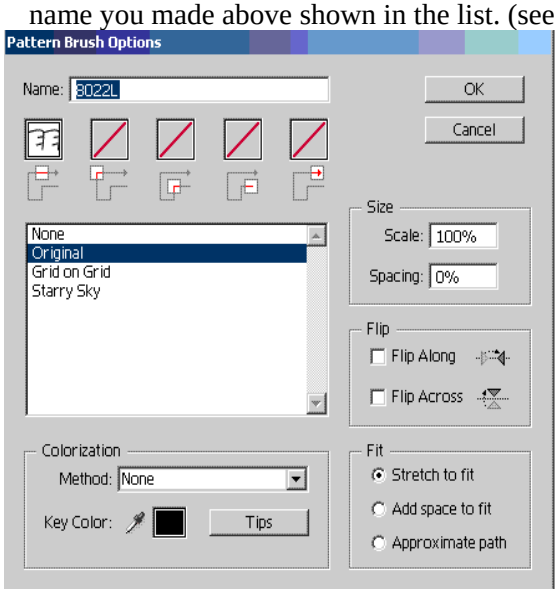


Image 42

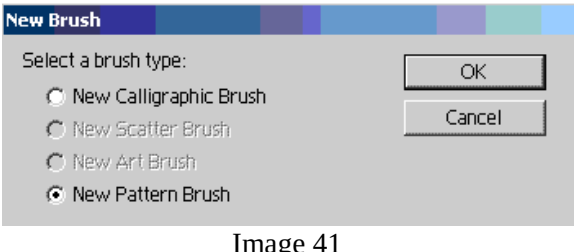


Image 41

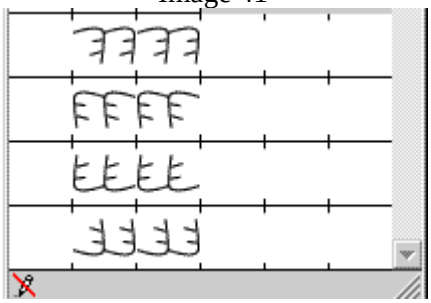


Image 43

d. When you apply reef symbols: select Line and apply pattern brush symbol as Fig.5.3.4.2. When set line weight of line you selected 1pt, it symbol show actual size. If you need to modify size , you can change line weight . According to expand brush symbol, you can edit each object.

e. Symbol shown always start of line to end of line, thus it recommended to prepare 4 type of pattern brush for any plotting case as Image 43.

5.4 Text

5.4.1 Horizontal or Vertical text

1 Select Type tool, then click any place you need to type. And then type.

2 Select above text to use any selection tool. Show character box: Choose window > Type > Character. And then you can change font, size and etc.. if necessary. (see Image 44) Apply text color to use fill color.

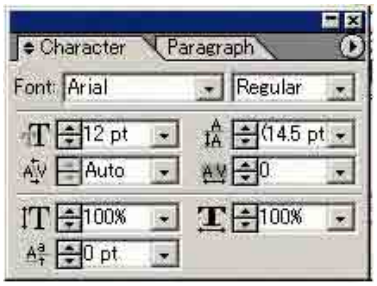


Image 44

3 If you need type vertical text, Select Vertical Type tool. Then type. Also you can change angle to use rotate tool.

Fig.4.1.1

4 If you need to shift baseline of text: Select text you need to shift to drag with text tool. (Fig. 4.1.1) Then chose point from baseline shift pop up menu. (see Image 45)

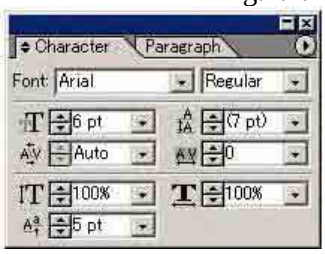


Image 45

5.4.2 Text along a river

1 Select river line. Then move with Alt key as along the river. One more line appears as along the river. Apply color as none fill and none stroke.

Fig.4.2.1

2 Select the line with Path type tool. (Fig.4.2.1) Then type name of river. You can arrange font, size and tracking space to use character box if necessary. (Fig.4.2.2)

Fig.4.2.2

6. Records of Symbols and Patterns

We can not make symbols and pattern one by one in the process of map symbolization. If you already made the symbols, you need to store some place. It is explanation how to store the Symbols and Patterns.

6.1 Point symbols

1 Select the object you need to store. Then show brush: Choose window > Brushes. (see Image 46) Then click the button at top right of Brushes box. And then select New Brush.

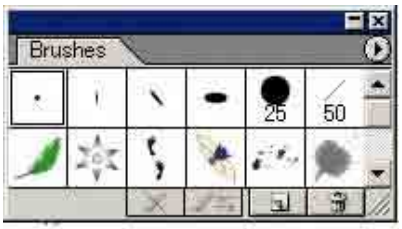


Image 46

2 Check New Scatter Brush. (see Image 47)
3 Then enter name of symbol in the name text box. Set each box as below:
Size 100 % Fixed, Spacing 1 % Fixed, Scatter 0 % Fixed, Rotation 0 % Fixed, Rotation relative to Page. (see Image 48)
4 Then click OK.

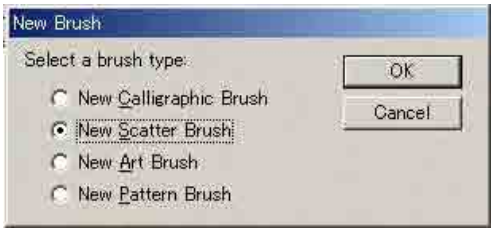


Image 47

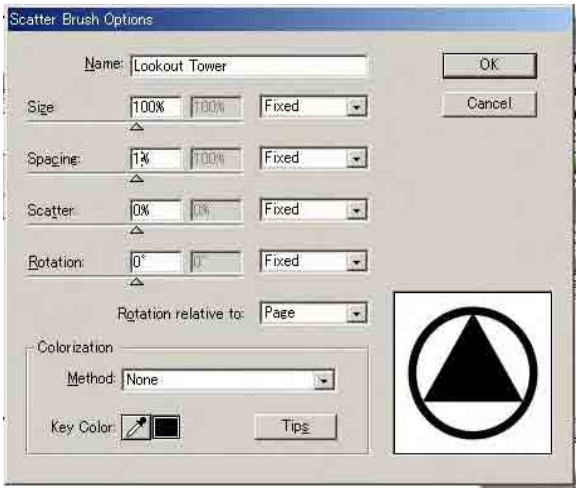


Image 48

4 If you need edit Brush object as isolated object, you can change brush object to isolated object as below:
Select the Brush object. Then Choose Object > Expand appearance.

6.2 Pattern

Follow these general guidelines for constructing pattern tiles:

As you create your pattern tile, zoom in on the artwork to align elements more accurately, and then zoom out from the artwork for the final selection.

For greatest efficiency in previewing and printing, a fill pattern tile should be about 1/2 inch to 1 inch square.

The more complex the pattern, the smaller the selection used to create it should be; however, the smaller the selection (and the pattern tile it creates), the more copies are needed to create the pattern. Thus, a 1-inch-square tile is more efficient than a 1/4-inch-square tile. If you are creating a simple pattern, you can include multiple copies of the object within the selection intended for the pattern tile.

To create simple line patterns, layer stroked lines of varying widths and colors and place an unfilled and none stroked bounding box behind the lines to create a pattern tile.

To make an organic or textural pattern appear irregular, vary the tile artwork subtly, not dramatically, for a more realistic effect. You can use the Roughen filter in the Distort menu to control variations.

To ensure smooth tiling, close paths before defining the pattern.

Enlarge your artwork view, and check for flaws before defining a pattern.

If you draw a bounding box around the artwork, make sure that the box is a rectangle, that it is the backmost object of the tile, and that it is unfilled and none stroked. To have Illustrator use this bounding box for a brush pattern, do not fill or stroke the box and make sure that nothing protrudes from it.

Example: Rice field (layer 073100)

1 Make symbol: Draw three lines to use Line segment tool as below: 0.6mm in length vertical, 0.4mm in length vertical, 1mm in length Horizontal. Then apply stoke weight 0.1mm, stroke color cyan 100.(see Fig.2.1)

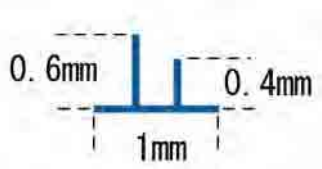


Fig.2.1

2 Select above object. Then choose Object > Transform > move. and then enter 4mm in the horizontal text box, click Copy.(see Image 26). Then make some more symbols with shortcut key “Ctrl + D” .(Fig.2.2)


Fig.2.2

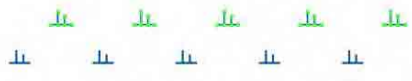


Fig.2.3

3 Select all above object. Then show move box as above. Then enter 2mm in the horizontal text box and 1.8mm in the vertical text box, then click copy. (Fig.2.3) Then make some more line with shortcut key “Ctrl + D” .(Fig.2.4).

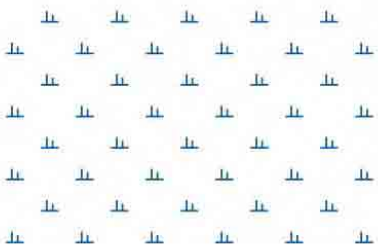


Fig.2.4

4 Make pattern bounding box: Select Rectangle tool, then enter the distance in each text box as below: Width 20mm, means four times of horizontal distance between a symbol and a symbol plus half and half (4mm x 4 + 2mm + 2mm). Height 14.4mm, means seventh times of vertical distance between a symbol and a symbol plus half and half (1.8mm x 7 + 0.9mm + 0.9mm). Then click OK. (see Image 49).Then apply none fill and none stroke color.

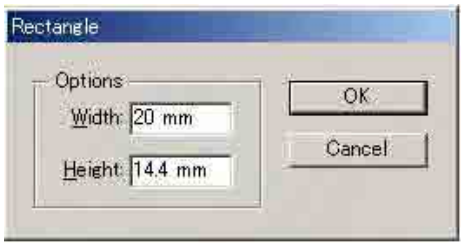


Image 49

5 Fix bounding box the symbol at bottom left corner as Fig.2.5. Then move 0.5mm in parallel and –0.9mm in vertical.(show Fig.2.6)

6 Select Bounding box. Then Choose Object > Arrange > Send to Back.

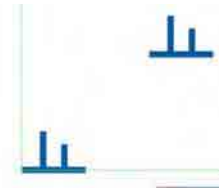


Fig.2.5

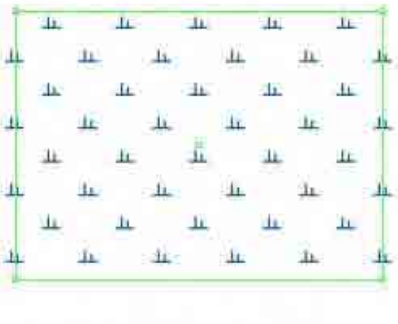


Fig.2.6

Image 50

7 Select all of symbols and bounding box . Then Choose Edit > Define Pattern. Enter Name of pattern in the Swatch Name text box. Click OK(see Image 50). It will be stored in Swatches palette.(see Image 51)

Image 51

7. Editing

7.1 Open CAD data with actual scale

* Use Map publisher ver.7 plug-in

1 File > new, set artboard size as 750 mm in width, 900 mm in height CMYK color

2 File > Import mapdata > advanced. (see Image 52)

3 Click Add and, Add palette shown,(Image 53), then select “AUTOCAD DWG/DXF” from pull down button. Then select data set by browser, and Source projection select “PRS92_UTM / Philippines UTM” projection file select from all projection category. (See Image 53)

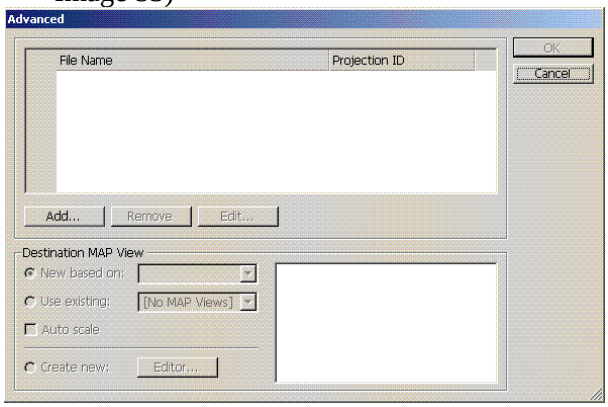


Image 52

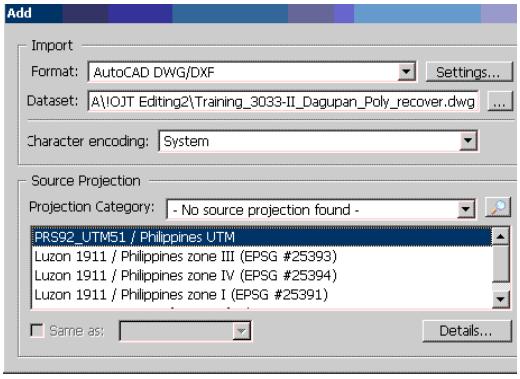


Image 53

4 Click Setting button, Setting dialog palette shown as Image 54. Check group entities: By layers name Blocks : uncheck Expand info entities, otherwise Symbols made by CAD shown in the illustrator file. Click OK

5 The result of setting shown in Advanced palette as Image 55. Then confirm file name and projection. If it is correct, select Create new and click Editor button.

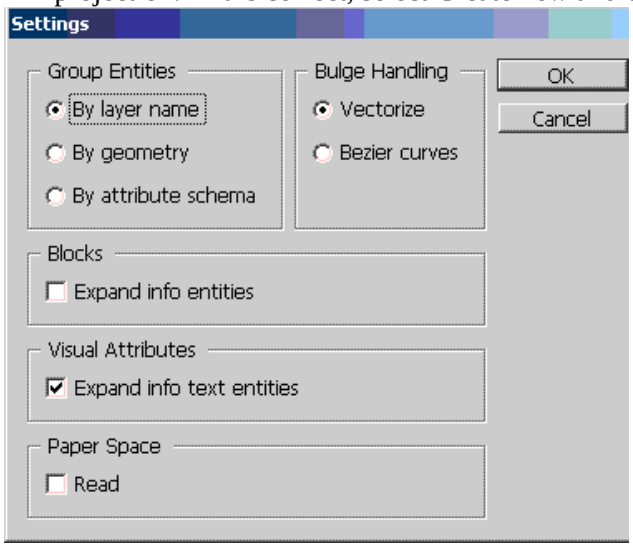


Image 54

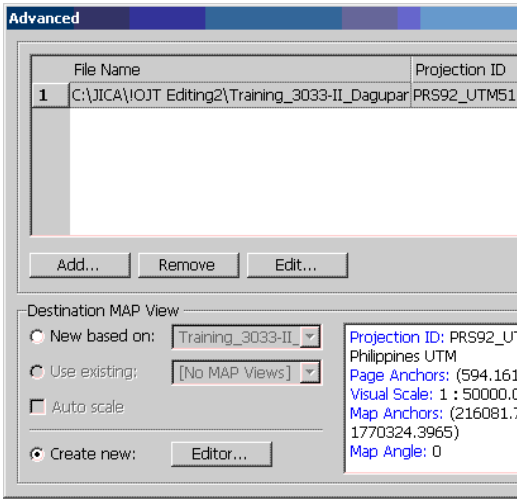


Image 55

6 Set scale: put 50000 into Scale text box. Then OK

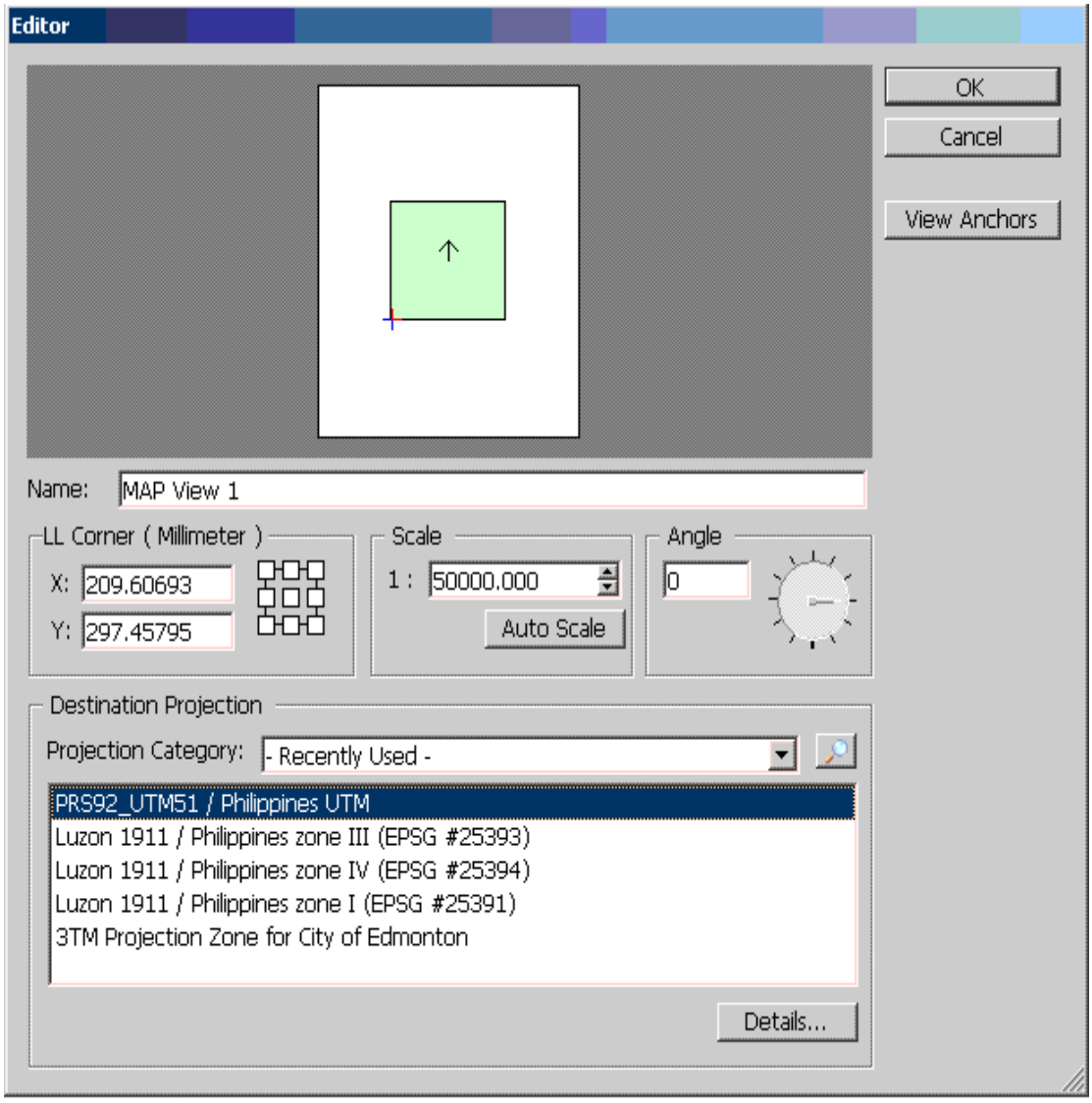


Image 56

7.2 Line feature

7.2.1 Joining split line

Roads, streams and contour are required to join if line is split in the same layer.
Required layers:
Roads, Boundaries, Supplementary Contour, Rivers and Canals
Other line features as escarpment are required to join if necessary.

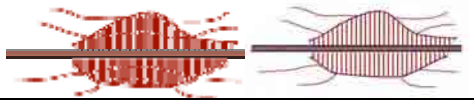
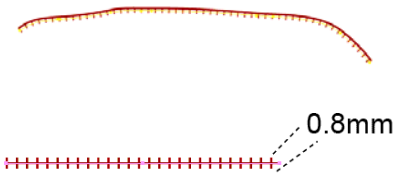
7.2.2 Line smoothing

The line features are recommended to smooth.
Select line object which recommended smoothing, Effect > Stylize > round corner, Then put 0.5mm in the text box.
Required layers for smoothing: all of road, river and contour.
*Do not apply this function for polygon features !

7.2.3 Symbolization

The line features will be symbolized according to specification. (see IV 1)

1 The layer as Cut , Fill Escarpment, Levee and etc. are required masking with whit, because contour should be not shown under those symbols. (see table)

Case	Masking type	Symbols
a. In case actual size of Polygon layers should be masked with polygon. Then fill white	Polygon	
b. In case minimum size of layers which plotted by lines should be masked as follows: Duplicate layers and put white stroke color.	Line	

2 Road layers

After symbolize Road layers, Layer chart should be arranged as show complete road network.

All of black line layers are arranged lower of layer palate. Layers of white line are located at middle. Layers of sepia are located upper. Location of white line layers and sepia layers recommended to change location if looking better.

(see Image 57)

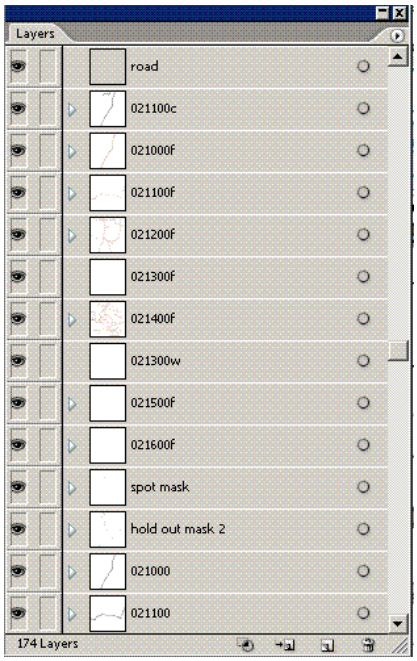


Image 57

3 LAYER 025100 Bridges line type

a Set line weight 0.5mm more than each road width.

b Put four lines (size: 0.6mm in length and 0.25mm in weight) on each corner of above line as symbol specification.

c Relocate the bridge layer lower than

7.3 Point features

7.3.1 Symbol preparation

All most point symbols will be symbolized to use Brush function. Thus the symbols which show frequently recommended to record in the Brush pallet. (see V. 1)

1 Replacement of symbol center.

Some of symbols as school are required to replace center. The bounding box is useful when new Brush is created.

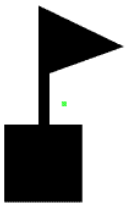


Image 58

a. Center of symbol shows as green point if Brush is created without bounding box.

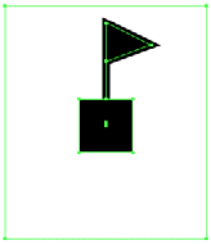


Image 59

b. Center of school symbol should be center of rectangle. To place bounding box (non fill non stroke) as Image 59. Then select both and create new brush. Center shows as Image 60.

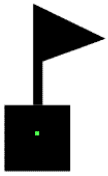


Image 60

7.3.2 Symbolization

1 Symbolize by Brush

a. Select all object in a layer, Then choose > object > ungroup, Choose object > transform > transform each, Show dialog box as Image 61, put 0 % into text box of scale. Then apply non fill non stroke.

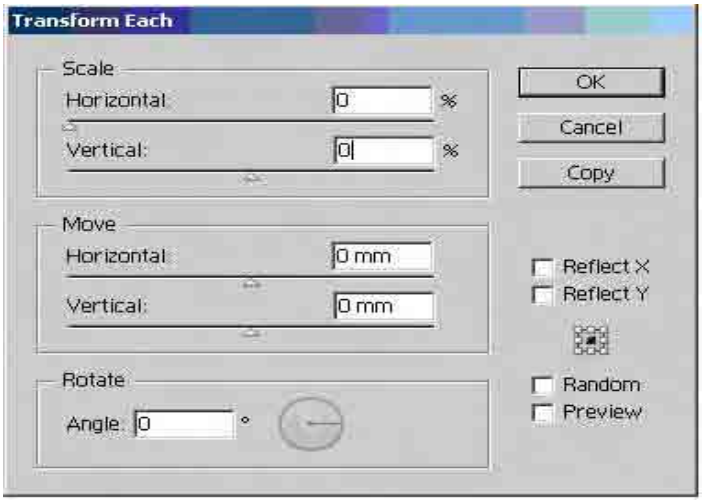


Image 61

b. Select all objects which scaled, then apply Brush.

c. Choose > object > Expand Appearance, Show dialog box as Image 62, check fill and stroke box, crick OK. Objects show as Image 63.

d. Select one original point (non fill non stroke scaled at method “a”) (Image 64), then Choose select > Same > fill & Stroke, all of original points will be selected, then delete.

Image 62

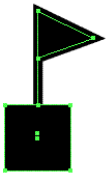


Image 63

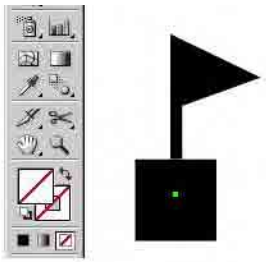


Image 64

2 LAYER 025200 point Bridge

a. Prepare 3 type of symbols in brush as follows:
   1) 1.5mm in length, 1.6mm in width, use for road 1.1mm in width as code 021100
   2) 1.5mm in length, 1.3mm in width, use for road 0.8mm in width as code 021200,021300
   3) 1.5mm in length, 1.1mm in width, use for road 0.6mm in width as code 021400, 021500

b. Prepared symbols allocate to use brush, then expand to object and rotate along each roads.

3 LAYER 041400 buildings

This symbol is point data. But it is required to draw with specified shape as same as the editing symbol daring plotting. Thus it need confirm size of symbol of dxf file. If it not same size as editing specification, should be scaled “transfer each”. Then fill with black and non stroke.

7.4 Polygon features

The polygon features will be symbolized according to specification. This is simple method. But you have to care following matter.

1 Donut polygon

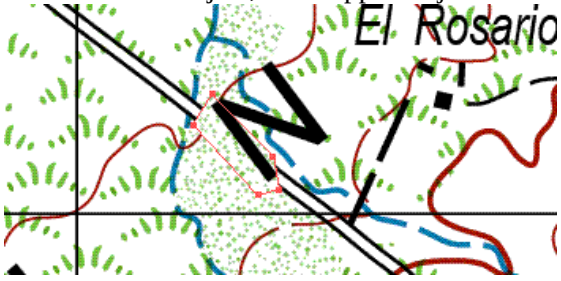
If donut polygon shows in the layer: Select both of inner polygon and outer polygon > exclude with pathfinder > expand. If impossible to exclude: create new layer at upper order, then Select inner polygon and move to new layer, then fill with white.

2 Separation of layers fill and layers stroke.

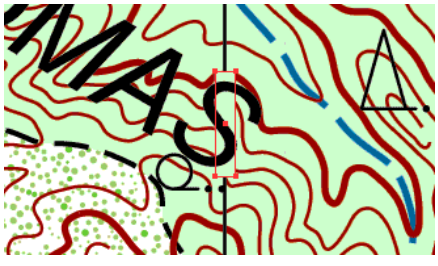
The polygons consist of fill and stroke as lake are required to separated each layer as 063100L(stroke) and 063100 (fill). Then stoke layer should be located upper than all of other polygon fill layers.

7.5 Annotation

Annotation layers should be located upper than grid line. Location of annotation is required to not placed on major road, building or landmark layers as same as possible. If annotations overlap with same color object, Overlapped objects are required to mask with background color.



In case overlap on the road



In case overlap on the grid line

The layer for masking will be located lower than annotation but upper than grid line.

7.6 Compilation

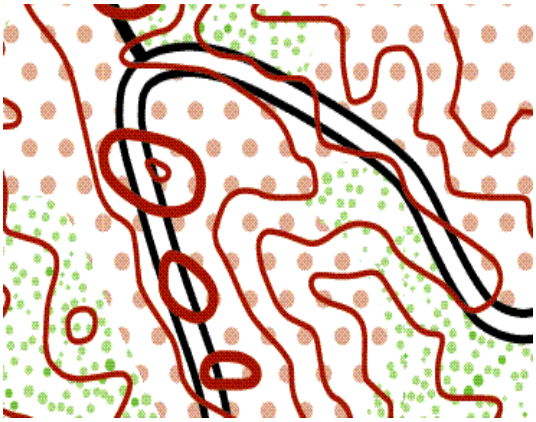
Any Symbols may not be printed correctly due to overlap the symbols and the symbols. It should be edited as shown on display and be printed correctly.

1 Overlap Roads and Contours, Streams or any line feature

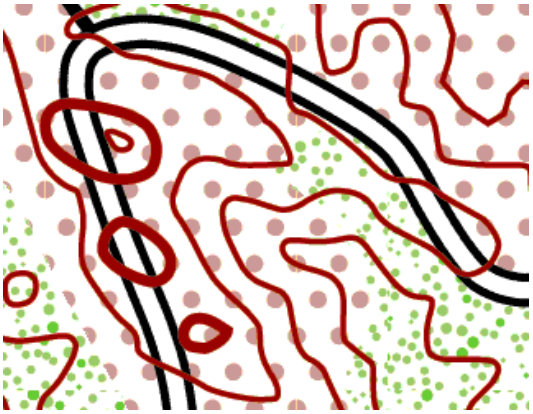
Contours should be edited as shown figure “After editing” in case contours shown on the roads as along.

The roads should be modified in case the livers or streams not shown due to overlap by the roads.

Any line Symbols as boundaries or power lines should be omitted the part of overlap with the roads.



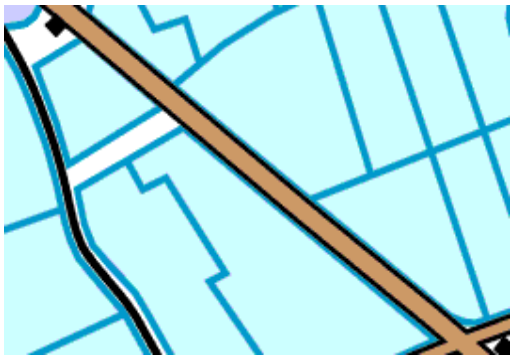
Before editing



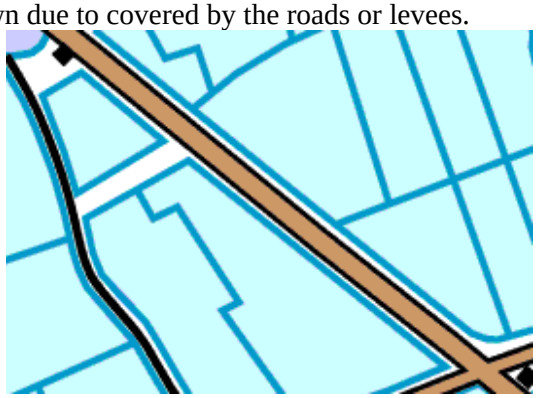
After editing

2 Overlap the shoreline with the roads, levee, escarpment or etc.

The Shore lines should be shown if it not shown due to covered by the roads or levees.



Before editing

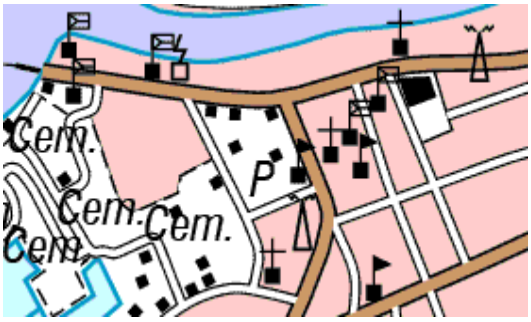


After editing

3 Building Symbols in populated area

If the building symbols overlap with other symbols, it should be modified with remove or rotate.

If the building symbols overlap with same color roads or any line objects, the roads or line object should be cut or masked.



Symbols overlap with roads or other symbols

The symbols modified with remove or rotate. The black lines of roads were cut.

7.7 Layers order

Layers order has to be considered to show all of symbols.
Finally layers order will be as follows:
Upper > Crop marks > Legend > Grid coordinate > Annotation > Mask for annotation > Grid line > Neat line > Hold out neat line > Boundaries > Power line > Building > Landmark > Spot height > Contour value > Mask for contour value > Contour > Road > Bridge > Stream and canal > Stroke layer for polygon as lake > Built up area, cemetery > Lake, river fill > Vegetation > Lower

8. Checking

8.1 Layer check

Basically one layer is recommended to be made by one color or pattern. Therefore it should be shown one color or pattern fill or stroke if you select all objects which are stored in a layer. If fill or stroke information show as image when you select objects, there are any different color inside of a layer. You have to correct colors.

The layers for annotation should be consisted of one fill color and one font type according to specification. It is required to check one layer by one layer with color information and character information.

8.2 Color, pattern and font check

Color and pattern check is required to do completely. Because it is required to use specified color only for offset print. Font also required to use specified fonts only.
Method of check as follows:
Choose window > document info and choose document, objects, or etc. as Image 65. If you check “Selection Only” Document info show about selected objects only.

In case it is checked according to specification of this project, Document info will show as follows.
Document: color mode will show CMYK color
Object: RGB Object: NONE
Transparent Object show if the sheet has international boundary. The other sheet will show NONE.

Spot color Objects, Pattern Objects and Fonts will show specified items only.

Brushes will show NONE because all of brush symbols should be expanded already.

Other information will show NONE

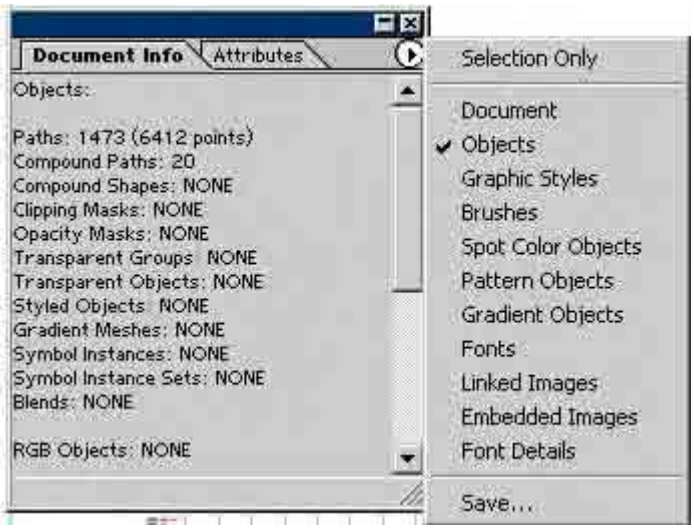


Image 65

9. Color Separation

Symbolized Topographic Map can consist of process (CMYK) colors, spot colors, or a combination of both. When you separate the map sheet, a separate plate or image is created for each process and spot color, with the plate/image containing objects of that specific color. The Output options in the Print dialog box let you control how you create color separations.

PostScript file or Printer driver should be installed on your PC for color separation.
The Output options in the Print dialog box shown as Image 66. You have to choose PostScript file or ADOBE PDF for copy to the file, chose Postscript printer for printing in printer column.

You can set the following Output option in the Print dialog box:

Mode

Specifies whether to print a Composite color image, Separations (Host-Based), or In-RIP Separations (this option is only available if you're using an Adobe PostScript Level 3 printer and your PPD file supports in-RIP separations).

The Mode option lets you choose whether to create a composite (where all the colors are printed on the same page or plate) or a separation (in which each color is printed on a separate plate). Separations can be created at the *host computer* (the system using Illustrator and the printer driver) or at the output device's RIP (raster image processor).

Once you select a separation mode, you can see any separations that are automatically created. By default, Illustrator creates a separation plate for each CMYK color used in the artwork.

Emulsion

Specifies whether the type is Up (Right Reading) or Down (Right Reading) when the photosensitive layer is facing you. The image flips if you change the reading.

Emulsion refers to the photosensitive layer on a piece of film or paper. *Up (Right Reading)* means that type in the image is readable (that is, "right reading") when the photosensitive layer is facing you. *Down (Right Reading)* means that type is readable when the photosensitive layer is facing away from you. Normally, images printed on paper are printed Up (Right Reading), whereas images printed on film are usually printed Down (Right Reading). Check with your print shop to determine which emulsion direction it prefers.

To tell whether you are looking at the emulsion side or the nonemulsion side (also referred to as the *base*), examine the final film under bright light. One side appears shinier than the other. The dull side is the emulsion side; the shiny side is the base.

Image

Specifies whether the image or film exposure is Positive or Negative.

You set the image or film exposure based on the requirements of your print shop. Typically, print shops require negative film in the United States and positive film in Europe and Japan. If you are unsure about which image type to use, consult your print shop.

To specify whether to create a separation for a color:

In the Output options of the Print dialog box, the Document Ink Options list labels each separation with the color name that Illustrator assigned it. A printer icon 🖶 next to the name indicates that Illustrator will create a separation for that color.

Do one of the following:

>To create a separation, make sure the printer icon is displayed to the far left of the color name in the dialog box. If it isn't, click the empty box to display the icon.
>To choose not to create a separation for that color, click the printer icon to the far left of the color name so that the printer icon disappears.

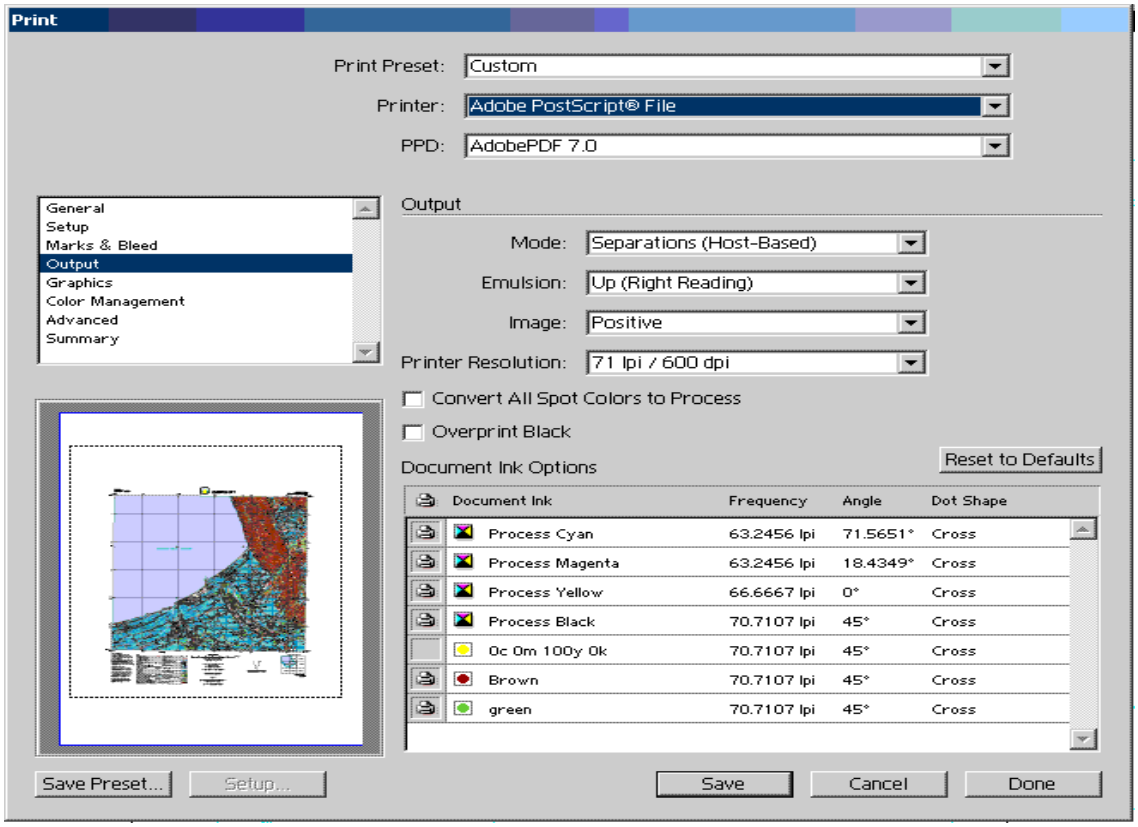

Print
Print Preset: Custom
Printer: Adobe PostScript® File
PPD: AdobePDF 7.0
General
Setup
Marks & Bleed
Output
Graphics
Color Management
Advanced
Summary
Output
Mode: Separations (Host-Based)
Emulsion: Up (Right Reading)
Image: Positive
Printer Resolution: 71 lpi / 600 dpi
Convert All Spot Colors to Process
Overprint Black
Document Ink Options
Reset to Defaults
Document Ink | Frequency | Angle | Dot Shape
Process Cyan | 63.2456 lpi | 71.5651° | Cross
Process Magenta | 63.2456 lpi | 18.4349° | Cross
Process Yellow | 66.6667 lpi | 0° | Cross
Process Black | 70.7107 lpi | 45° | Cross
0c 0m 100y 0k | 70.7107 lpi | 45° | Cross
Brown | 70.7107 lpi | 45° | Cross
green | 70.7107 lpi | 45° | Cross
Save Preset...
Setup...
Save
Cancel
Done

Image 66